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Report No. 8275

PROJECT COMPLETION REPORT

KOREA

FOURTH AGRICULTURAL CREDIT PROJECT
(LOAN 2549-KO)

DECEMBER 22, 1989

Agriculture Operations Division
Country Department II
Asia Regional Office

EXCHANGE RATE

US$1.00 = Won 800 (Appraisal Report)
US$1.00 = Won 792 (Average Exchange Rate)

FISCAL YEAR

January 1 - December 31

ABBREVIATIONS

BOK	-	Bank of Korea
CO	-	Country Office of NACF
FLO	-	Foreign Loan Office of NACF
LAO	-	Loan Appraisal Officer of CO
MAFF	-	Ministry of Agriculture, Forestry and Fisheries
MOF	-	Ministry of Finance
NACF	-	National Agricultural Cooperative Federation
NLCF	-	National Livestock Cooperative Federation
OED	-	Operations Evaluation Department
OCE	-	Office of Construction and Engineering
PC	-	Primary Cooperative
PCO	-	Participating country offices of NACF
PCR	-	Project Completion Report
PIP	-	Project Implementation Plan
SC	-	Special Cooperative
TU	-	Technical Unit of NACF

THE WORLD BANK
Washington, D.C. 20433
U.S.A.

Office of Director-General
Operations Evaluation

December 22, 1989

MEMORANDUM TO THE EXECUTIVE DIRECTORS AND THE PRESIDENT

SUBJECT: Project Completion Report on Korea
Fourth Agricultural Credit Project (Loan 2549-KO)

Attached, for information, is a copy of a report entitled "Project Completion Report on Korea - Fourth Agricultural Credit Project (Loan 2549-KO)" prepared by the Technical Unit of Korea's National Agricultural Cooperative Federation (NACF). No audit of this project has been made by the Operations Evaluation Department at this time.

Attachment

FOURTH AGRICULTURAL CREDIT PROJECT
(LOAN 2549-KO)

PROJECT COMPLETION REPORT

TABLE OF CONTENTS

PROJECT COMPLETION REPORT

KOREA

FOURTH AGRICULTURAL CREDIT PROJECT (LOAN 2549-KO)

PREFACE

This is the Project Completion Report (PCR) of the Fourth Agricultural Credit Project in Korea, for which Loan 2549-KO in the amount of US$25 million equivalent was approved on June 25, 1985. The loan was fully disbursed on February 19, 1988 and closed on February 19, 1988, one year ahead of schedule.

The PCR was prepared by the Technical Unit of Korea's National Agricultural Cooperative Federation (NACF), while the Asia Regional staff prepared the Evaluation Summary.

This PCR was read by the Operations Evaluation Department (OED). The draft PCR was sent to the Borrower for comments and they are attached to the Report (Attachment 1).

PROJECT COMPLETION REPORT

KOREA: FOURTH AGRICULTURAL CREDIT PROJECT (LN. 2549-KO)

BASIC DATA SHEET

KEY PROJECT DATA

	Appraisal Estimates	Actual or Est. Actual	Actual as % of Appraised Estimate
Total Project Cost US $ Million	55.5	73.1	132
Total Project Cost Won Million	44,400	57,734	130
Loan Amount $ Million	25.0	25.0	100
Date Physical Components are Completed	Dec. 31,1988	Dec. 31,1987	100
Proportion Completed by that Date (%)	100	100	100
Economic Rate of Return %	17-46	13-50	
Financial Rate of Return %	18-50	15-50	
Number of Loans	8,500	18,440	206

STAFF INPUT
(Staffweeks)

	FY82	FY83	FY84	FY85	FY86	FY87	FY88	TOTAL
Preappraisal	.6	2.5	36.6	-	-	-	-	39.7
Appraisal	-	-	10.1	36.2	-	-	-	46.3
Negotiation	-	-	-	15.2	-	-	-	15.2
Supervision	-	-	-	.5	2.2	.7	4.7	8.1
Total	.6	2.5	46.8	51.9	2.2	.7	4.7	109.3

CUMULATIVE DISBURSEMENTS

	FY86	FY87	FY88	FY89
Appraisal Estimate (US$ M)	8.5	16.0	22.5	25.0
Actual (US$ M)	12.0	19.6	25.0	
Actual as 10% of Estimate	141	123	111	

Date of Final Loan Disbursements: February 19, 1988

PROJECT DATES

	Original Plan	Actual
Identification	March 1983	
Preparation	February 1983	
Appraisal	June 1984	
Negotiations	April 1985	
Board Approval		May 21, 1985
Loan Agreement		June 25, 1985
Loan Effectiveness		September 23, 1985
Loan Closing Date	March 31, 1989	February 19, 1988

MISSION DATA

	Dates	Specialist Represented	Staffdays in Field	Rating
Project Preparation:	Feb. 1984			
Project Appraisal:	June 1984	1/		
Supervision 1:	Oct. 1985	F	3	1
Supervision 2:	Jun/Jul 1986	F	12	1
Supervision 3:	Dec. 1986	G	8	1
Supervision 4:	Nov. 1987	C	11	1
Total Staffdays Supervision			34	

OTHER PROJECT DATA

Borrower:	Government of Korea
Executing Agency:	NACF
Fiscal Year of Borrower:	January - December
Name of Currency:	Korean Won
Currency Exchange Rate:	
Appraisal Report	US$ 1.00 = Won 800
Average Exchange Rate	US$ 1.00 = Won 792
Follow-up Project:	None

1/ F = Loan Officer; G = Generalist; C = Credit Specialist

PROJECT COMPLETION REPORT

KOREA

FOURTH AGRICULTURAL CREDIT PROJECT (LOAN 2549-KO)

EVALUATION SUMMARY

Introduction

The project both overlapped and contributed to the success of government's Sixth Five Year Socioeconomic Development Plan. Particularly, it assisted increasing the production of fruits and vegetables meeting rising consumer demand and improving the income of small farmers through intensification and diversification. The project was highly successful and followed three successful similar Bank-assisted projects.

Objectives and Rationale

The project focused on agricultural credit as a means to promote agricultural development through financing small farm, private sector investments covering a wide range of agricultural production and rural income diversification activities. The project was also designed to improve the National Agricultural Cooperative Federation's (NACF) profitability, and resource mobilization. Government was to assist in reviewing NACF's financial conditions (NACF had incurred losses during 1982 and 1983) and to propose measures to improve its efficiency and financial condition.

Implementation, Results and Sustainability

The project was very successful. It contributed to increasing agricultural production, particularly of fruits, vegetables and special crops, and fostered diversification, intensification, income and employment. However, foreseen investments for non-farm investments by farmers and cooperatives, including marketing facilities, were not financed to the expected. It seems that NACF hesitated to promote such lending for lack of experience and a certain conservatism. NACF, however, was more progressive in supporting diversification activities such as special crops and a multitude of fruits and vegetables, mostly through simple, unsophisticated greenhouse culture.

A total of 18,440 subloans were made. This was more than twice as many (8,500) foreseen since more expensive non-farm and marketing loans were neglected and not financed as planned. The average loan size was about US $2,500 equivalent. About 70% of project beneficiaries had less than 1 hectare of land. There was a cost overrun of some 30% which was financed by higher contributions from investors (36% versus 30%) and Government/NACF (27% versus 25%); the Bank Loan eventually financed 37% of cost as compared to 45% foreseen.

But more importantly, greenhouse and special crops investments again (as in the Third Project) were much higher than planned, due to very high demand both from investors and from consumers. This negated fears of market and price risks. A total of 62% of loans went for greenhouse investments and 18% for special crops, with orchard development (8%) and on-farm storage (4%) being much less important. A total of only 8% went for irrigation, beekeeping and non-farm investments. The project was completed in less than three years, instead of four years foreseen of 1988, when the loan was fully disbursed, one year ahead of the original Loan Closing Date.

Financial and economic rates of return of investments were high, varying between 13% and over 50%, very similar to appraisal estimates. Project investments created about 8,000 additional man-year employment permanently.

NACF's financial conditions and efficiency improved. There were small net earnings (after 1982 and 1983 losses) for the year 1984 through 1987. Government provided NACF with 21.9 billion won to protect NACF and the foreign exchange risk of the loan. This loan bears interest at 10%, versus an onlending rate of 8%. It has thus provided temporary liquidity, rather than a long term remedy to the problem of foreign exchange risk.1/ Government also provided the sub-borrowers from NACF with loans covering the difference between farmers' contributions/World Bank loan and total project cost. These loans were for a 12-year period, including two years grace, at 7% p.a. NACF was thought to need a 3% interest rate spread to cover its costs and a 12% interest rate was charged to farmers during the early part of the project during 1985 and 1986. However, this rate was reduced to 11.5% as of January 1, 1987, and to 8% as of March 16, 1987, with government compensating NACF for incurred losses. After project completion, government announced that all outstanding loans could be put in grace for five years with ensuing 7-year repayment regardless of its original terms. Again, government committed itself to compensate NACF for incurred losses due to that. However, farmers would need to apply for this loan extension and, eventually, 61% of subloans made under the project was applied for. This new development may erode the high repayment discipline of NACF borrowers and threaten NACF's financial viability in the future. NACF had 10.6% of its Fourth Project loans in arrears, but this was of no concern at this point of time; NACF's financial position is very sound. Only 4% of all loans outstanding made under the four projects were in arrears by December 31, 1987. At the same time, NACF's total outstanding loan portfolio was about US$7.5 billion equivalent; US$60 million loans were delinquent, less than one percentage point. However, the independent auditor reported that government was delinquent to NACF for payments, some of which for 15 years, totalling about US$1.7 billion equivalent. This is of some concern.

1/ In 1989 NACF has had to reduce lending by 25% due to scarcity of long term funds.

Sustainability

Sustainability of farm investments look robust, provided Korea's economy continues generating high consumer demand for fruits and vegetables. NACF has developed into a technically highly competent institution, hence its institutional health depends on government's agricultural policy, including its interest rate policy.

Findings and Lessons

a) NACF strengthened under the project and benefited from its association with the Bank which it holds in high regard.

b) Since NACF had to carry the FE risk for this Bank Loan, it has so far refrained from seeking a follow-on Loan. This is because government dictates an interest rate to farmers below market rates, without compensating NACF fully for its losses due to such policy.

c) Small farm greenhouse investments proved to be highly profitable investments for small farmers.

d) NACF managed its affairs conservatively and lacked enthusiasm for non-farm investment financing. Therefore, investments foreseen (30% of project expected) like handicrafts, weaving, machinery repair shops, inland fisheries, tourism facilities, and wood and metal workshops were not financed. This is regrettable.

PROJECT COMPLETION REPORT

KOREA FOURTH AGRICULTURAL CREDIT PROJECT

(IBRD LOAN NO. 2549-KO)

October 31. 1988

PREPARED BY

TECHNICAL UNIT

FOREIGN LOAN OFFICE

INTERNATIONAL BANKING DEPARTMENT

NATIONAL AGRICULTURAL COOPERATIVE FEDERATION

SEOUL KOREA

Preface

This report presents the result of execution of the Project, its cost and benefit derived from it, in accordance with section 2.10 of the Project Agreement.

The report has been prepared by the Technical Unit (TU) of the National Agricultural Cooperative Federation (NACF) for the achievement and evaluation results of the Project for which the World Bank provided US$ 25 million equivalent ₩ 21,467 million to the Government of Korea under the Loan Number of 2549-KO, signed on June 25, 1985.

The Project was carried out successfully by the Technical Unit of NACF, under the Project Agreement between IBRD and NACF dated June 25, 1985.

The information and data have been collected and obtained from two categories by TU : one from a survey of farm fields for which TU had made many field visits and one from periodic reports by the loan appraisal officers of the Project Participating County Offices of NACF.

This report is the Project Completion Report as well as the Project Evaluation Report.

On this opportunity, we wish to express our deep gratitude to the Bank for the cooperation and kind advice by specialists concerned for the successful completion of the Project.

Sincerely yours

Eun Kee Song
Director and General Manager
International Banking Department
National Agricultural Cooperative Federation

Editorial staff of the Project Evaluation Report

Foreign Loan office of
International Department,
NACF

Hyun-ka Chung,	General Manager. Overall supervision and advice.
Kun-soo Lee,	Project Manager. Chief of the editorial staff
Young-chul Kim,	Farm machine specialist. Planning and administration. Summarized and wrote the Project results and evaluation, surveyed and analysed farm machinery and beekeeping subproject.
Doo-sup Lee,	Greenhouse specialist. Summarized and wrote the Bank's assistance, surveyed and analysed greehouse subproject.
Byoung-yeon Kim,	Orchard development specialist. surveyed and analysed fruits and up-land irrigation subprojects.
Min-sup Shin,	Administrator and special crop specialist. Summarized and analysed special crop subprojects and wrote Project implementation.
Chang-bai Son,	Assistant administrator. collected and processed the information and data.

Currency Equivalents

December 1987

Won (₩)1 = US$ 0.00126
Won 792 = US$ 1.00
₩1 million = US$ 1,260.00
₩1 billion = US$ 1.26 millions

Weights and Measures

1 meter (m) = 3.28 feet (ft)
1 kilometer (km) = 0.62 miles
1 hectare (ha) = 2.47 acres (ac) = 3,000pyongs
1 kilogram (kg) = 2,205 pounds (lb)
1 ton (t) = 1,000kg = ٢,٢٠٥ lbs
1 pyong = 3.3sq. m

Abbreviations

NACF : National Agricultural Cooperative Federation
NLCF : National Livestock Cooperative Federation
FLO : Foreign Loan Office of NACF
TU : Technical Unit of NACF
CO : County Office of NACF
PC : Primary Cooperative
SC : Special Cooperative
LAO : Loan Appraisal Officer of CO
BOK : Bank of Korea
MAFF : Ministry of Agriculture, Forestry and Fisheries
PIP : Project Implementation Plan
PCO : Participating county offices of NACF.

The Project : The Fourth Agricultural Credit Project
(IBRD Loan No. 2549-KO)

The three Previous Bank-assisted agricultural credit Projects

The 1st Project : 335 - KO
The 2nd Project : 1328 - KO
The 3rd Project : 1974 - KO

KOREA

The Fourth Agricultural Credit Project

(Loan No. 2549 - KO)

I Introduction

1.01 This is the final report on completion and evaluation of the Fourth Agricultural Credit Project. Therefore the report records what NACF as the Project manager achieved and found out what problems were, what lessons learned were during the Project period, which may be useful for future reference on agricultural credit projects in Korea.
This report is prepared and furnished to the Bank pursuant to the Project Agreement of the Fourth Agricultural Credit Project between the Bank and NACF.

II The Project

A. Contents of the Loan

2.01 Loan number : 2549 - Ko

Loan amount : US$ 25 million

Borrower : Government of Korea
Executing Agency : NACF
Beneficiary : Farmers (including member farmers of coops)
Date of Loan Agreement : Jun. 25, 1985
Date of Loan Effectiveness : Sep. 23, 1985
Date of final Disbursement : Feb. 19, 1988
Date of Project completion : Dec. 31, 1987

B. Project Objectives

2.02 The objectives were to finance NACF subloans to farmers and its member cooperatives so that it would contribute to increasing the farm productivity, creating off-season employment, and thus help to expand rural income.
The implementing period, overlapped in part with Korea's Sixth Five-Year Socioeconomic Development Plan (1987 - 1991)
The important strategic points of the Government's Agricultural Development Plan in the Five-Year Plan are :

1. To adjust the agricultural production system for steady supply of food grains for nation.
2. To improve the agricultural structure for expansion of agrlcultural productivity.
3. To maintain prices and balance supply for demand of agricultural products.
4. To develop agro-industrial districts in the country so as to improve rural income.
5. To assist young farmers
6. To activate the rural economy and develop rural potential through improved supporting systems such as financing and bether tax system.

2.03 The target of agro-economic growth during the new Five-Year Plan is 2.4% growth on the average annually, and increase farm income by 7.5% on the average annually.

To support the Socioeconomic Development Plan, NACF provides medium and long term investment credit for farmers to increase farm production . In a word, the objectives of the Project matched very well with government's Five-Year Plan of Korea in every sector.

C. Project Description

2.04 Under the Project NACF assisted in :

1. Promoting agricultural development through private investments, covering wide range of agricultural production and marketing activities : and
2. Strengthening farmers' financial capabilities.

2.05 The Project consisted of the following parts :

1. NACF subloans to farmers for their private investments in :
   - A. Agricultural production facilities.
   - B. Farm machinery and equipments.
   - C. Marketing and storage facilities.
   - D. Input manufacturing and supply.
   - E. Agroprocessing facilities and other rural business opportunities to expand off-farm income sources.
2. Measures to improve NACF's profitability and resource mobilization.

During the Project, NACF financed farmers for their farm business investments such as above mentioned category A,B,C, and E, except D.
As to the part D, no farmers wished to invest their money in this part during Project period.

TU devided investment items of each subproject into two parts, that is, fundamental items and additional items.
The difference between fundamental items and additional items is :

- A. Fundamental item : items that are important and necessary for the subprojects basically.
- B. Additional item : items that are not neccessary absolutely but conveniont if farmer have one.

2.06 The actual percentage of each subproject was as follows :

Subprojects	Amount (million Won)	Percentage (%)
Greenhouses	36,128	62
Special crops	10,666	18
Orchard development	4,527	8
On-farm stoage	1,934	4
Upland irrigation	1,835	3
Oil service center	1,613	3
Beekeeping	621	1
Farm machinery	610	1
Total	57,934	100

Investments were financed as follows :

Resource provider	Amount (million Won)	Percentage (%)
The Bank	21,467	37
Government fund	15,437	27
Farmers own fund	21,030	36
Total	57,934	100

Description and detailed investment items by subprojects were as follows:

Subprojects	Description of investment items
Greenhouse for Vegetable	New construction or frame replacement of existing old greenhouses and provision of farm inputs required for the production of the initial crops. Fundamental items : metal frame, covering materials for heat insulation and operating capital for the initial crop of vegetables. Additional items : sprinkler system, ventilating fans, heating stoves and double curtain.
Upland irrigation (Sprinkler)	Construction of sprinkler irrigation facilities for orchards and vegetable farms. Fundamental items : water pump, piping sprinkler sets Additional items : well digging, electric wiring and installation costs.
On-farm storage	Construction of on-farm fruit storehouse. Fundamental items : storehouse for fruits. Additional items : wooden or plastic boxes for stored fruits.
Orchard development - grapes - Peach - sweet persimmon. - apple - pear - jujube - plum - citron	Establishing new fruit orchards. Fundamental items : saplings planting and management costs of initial year. Additional items : land reclamation, farm chemical mixing tanks, fences, wells etc.
- Orchard facilities (grapes)	Branch supporting structures. Fundamental items : branch supporting structure, wiring, labor costs. Additional items : none.

Farm machinery	Provision of : A. Speed sprayer for spraying farm chemicals. B. Fruit sorter for fruit grading. C. Power mower for orchard weed.
Special crops - Oyster mushroom	Fundamental items : mushroom house, heating system, tools, fungi beds, working capital for initial crop. Additional items : water spraying facilities.
- Oak mushroom	Fundamental items : oak logs for fungi bed, fungi, wiring, working capital for initial crops, Additional items : water spraying facilities.
- Omeeja fruit	Fundamental items : roots, hired labor. Additional it land reclamation (if any), farm chemical mixing tank, fence, well.
- Deodug root	Fundamental : seeds, supporting structure, working capital for initial crop. Additional items : none.
- Ginseng	Fundamental items : roots, shade frame, management costs. Additional items : none.
Beekeeping	Less than 20 bee hives per farm. Fundamental items : bee hives including honey bees, comb foundation, working capital for initial crop. Additional items : honey extracter, small tools.

III Project implementation

3.01 The Loan become effective on Sep. 23, 1985, and was fully disbursed by Feb. 19, 1988, about one year ahead of expected time in the Loan Agreement. The Project was expected to be completed by Sep. 30, 1988. The Project implementation result by year is as follows :

Project implementation result

	1985	1986	1987	Total
Number of Participating COs	96	124	98	125
Number of beneficiaries	6,072	6,814	5,554	18,440
Loans made (million Won)	12,030	11,290	13,584	36,904
The Bank loan (US$ million)	5	11	9 *1	25

*1 US$ 1.9 millions out of 9millions were disbursed in the first quarter of the year 1988.

A. Implementation organization

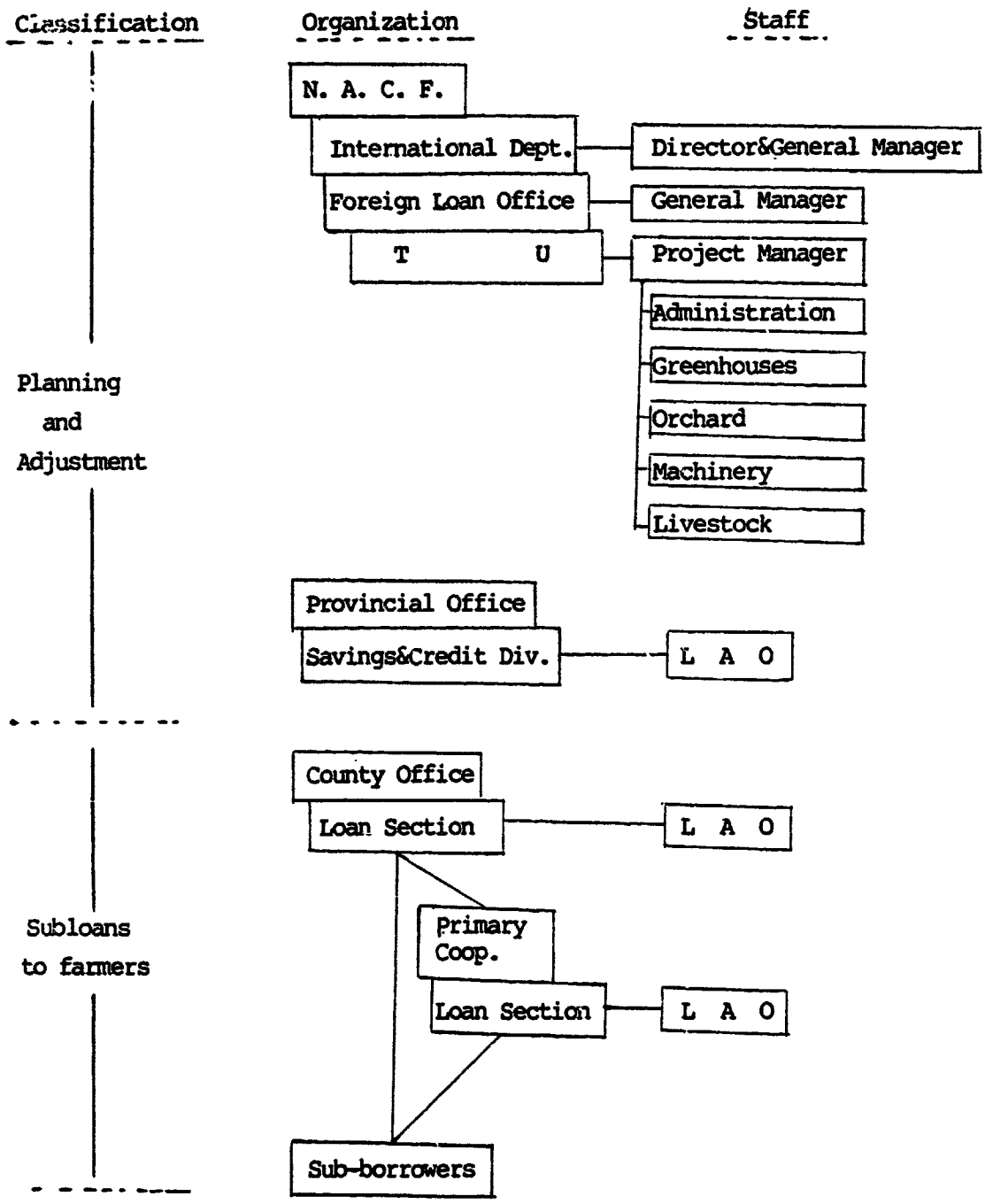
3.02 The Technical Unit (TU) of NACF - established the implementation procedures and guidlines annually for the Project implementation. The COs followed these guidelines when making loans for farmers.

Technical Unit of NACF

1. Prepared Project implementation plan annually.
2. Provided theoretical and technical information and advice for participating COs so that their loan appraisal officers (LAOs) could appraise the investment plan submitted by farmers.
3. Trained LAOs to carry out Project Implementation Plan properly.
4. Allocated Project funds to the participating COs for loans to farmers.
5. Monitored the progress of the Project.
6. Analysed Project progress and reported the results of analysis to the world Bank and Government of Korea.
7. Formulated the Loan regulations and Project Implementation Guidelines, including nationwide applicable farm models, etc.

3.03 The Technical Unit (TU) consisted of a project manager, four specialists and an assistant administrator.
The following diagram shows organization and staffing for the Project implementation, including TU and LAOs.

Organization and Staff for the Project Implementation



B Implementation Procedure

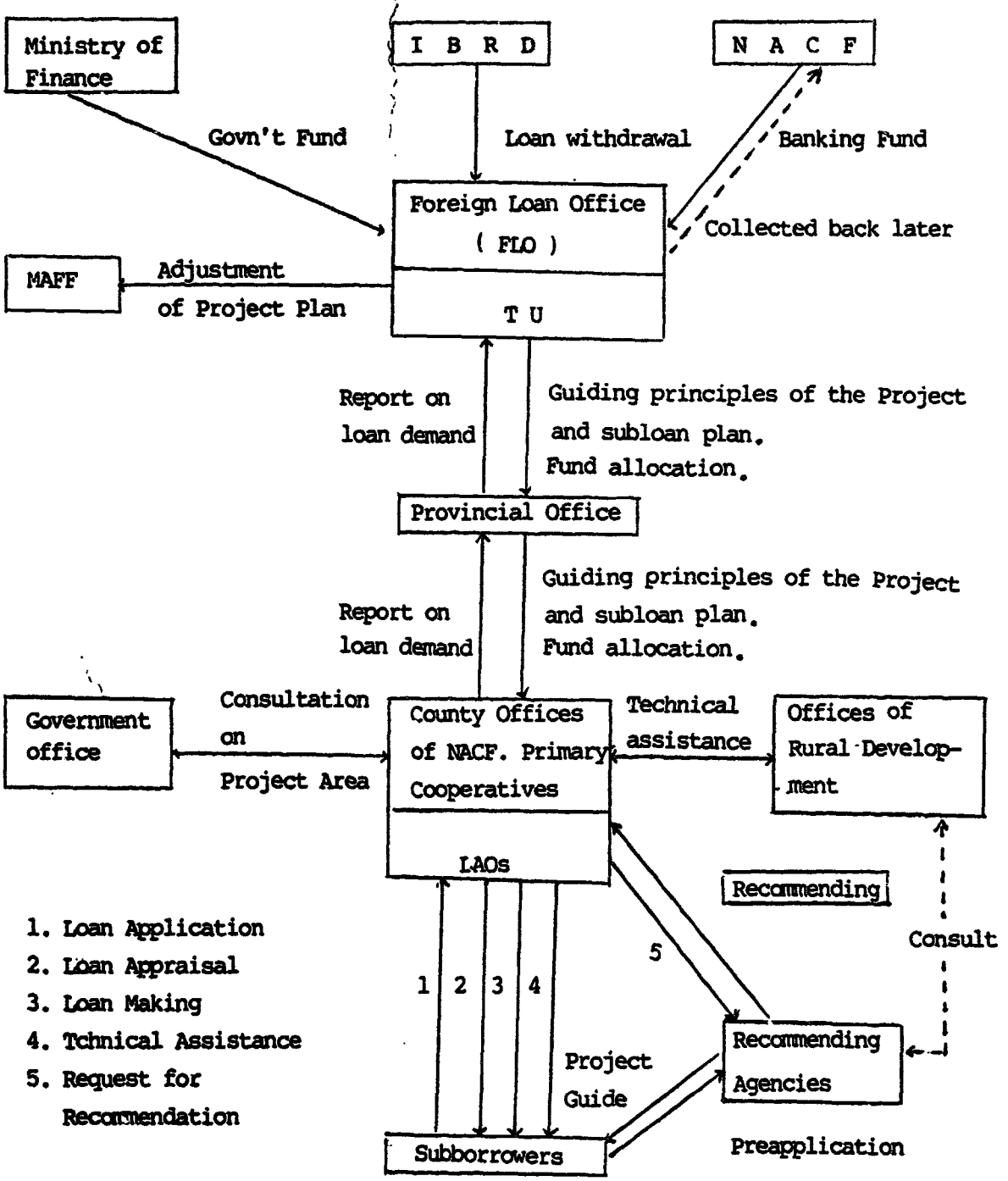
3.04 TU carried out the overall implementation of the Project and county offices of NACF loans to farmers.

The procedures were :

1. TU surveys and examines the loan demand reported through provincial offices of NACF from county offices.
2. Farmers apply to the county offices of NACF for loans directly or by way of primary coop's recommendation.
3. TU prepared the guiding principles of Project operation.
4. TU trains the LAOs of provincial branch offices and county offices.
5. TU allocates fund for subloans to provincial and county offices.
6. LAOs make loans to farmers according to the loan regulations and guiding principles.

The details of implementation procedure were as follows :

Project Implementing Procedure

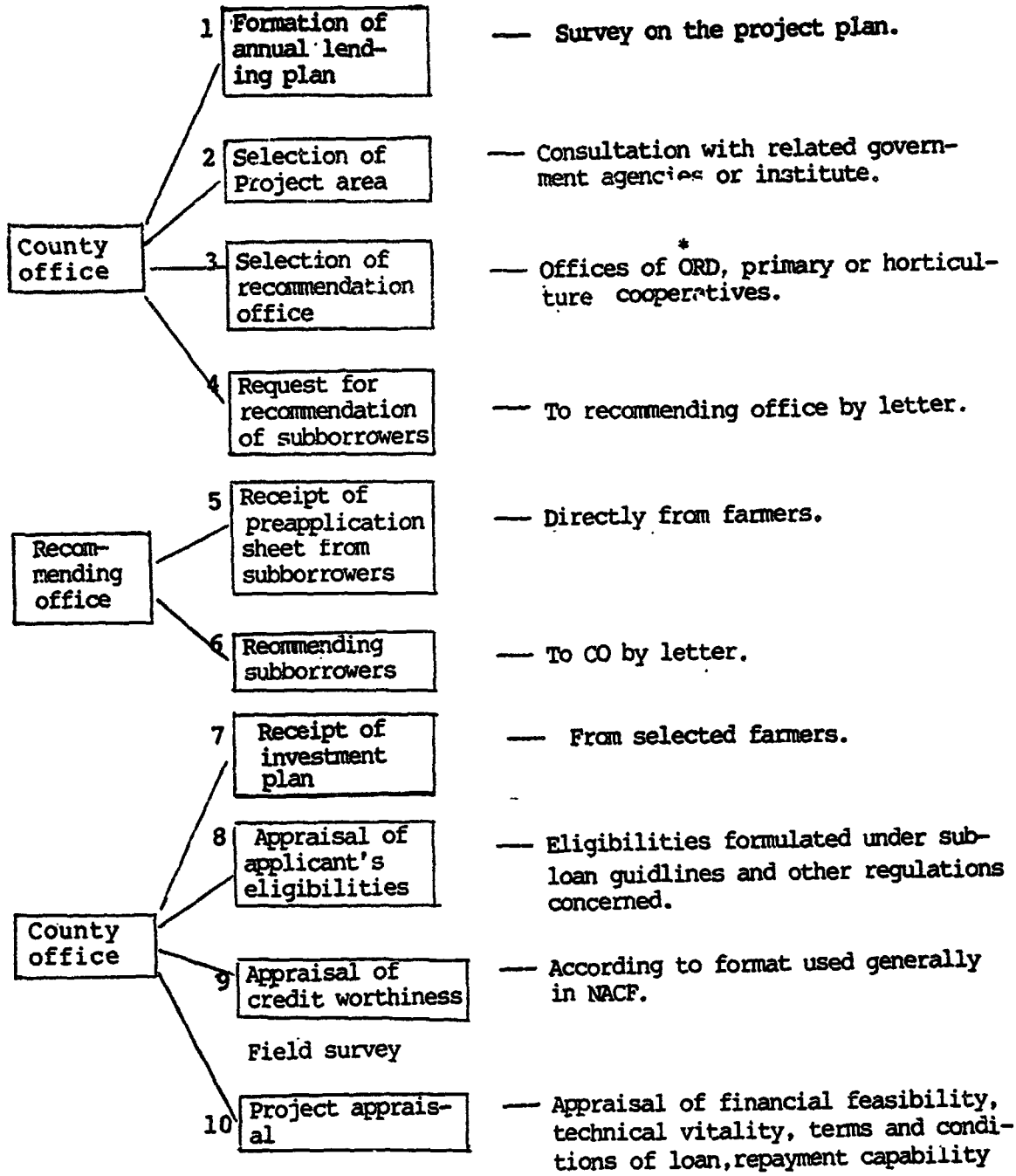


3.05 County offices consulted with some institutions in their region and/or received recommendation from them before making any loan to subborrowers.

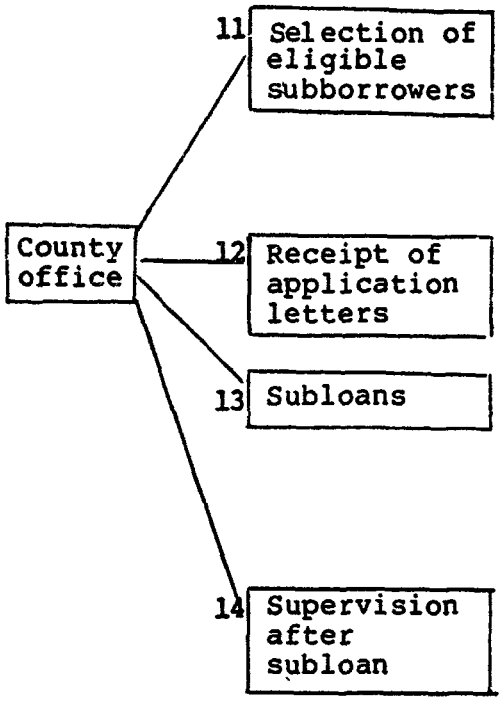
LAOs of COs selected eligible borrowers by field survey and appraised farmers' individual investment plan according to regulations of NACF.

The details of these mutual cooperation are shown in the Project implementation flow chart bellow :

Project Implementation Flow Chart



* ORD : Office of Rural Development of Korea.



--- Select eligible subborrowers within allocated loan ceiling and notify each subborrower of the selection result.

--- From each eligible subborrower.

--- After examining "Investment Plan appraisal sheet" and attainment of legal securities, NACF makes loans to eligible subborrowers.

--- Payment from loan management account by the Project progress and technical assistance along with monitoring and supervision.

C. Implementation Guideline

3.06 Guidelines for lending and implementation of the Project were formulated annually by TU for the purpose of effective implementation and fund management. In 1985, the beginning year of the Project, TU recommended basic directions on some important policy and institutional matters and got the approval of NACF management and MAFF. The major directions were as follows :

(a) The interest rate charged to subborrowers was 12% p.a. at the starting point. But the interest rate was changed as follows :

Starting	:	12%
From JAN. 1, 1987	:	11.5%
From MAR. 16, 1987	:	8.0%

NACF reduced the interest rate under projects from the previous 11.5% to 8% p.a. as of March 16, 1987, in accordance with Government policy. Government compensated NACF for 3.5% interest gap.

(b) TU was responsible for the selection of new subprojects.

(c) Under the First and the Second Project, participating cooperatives selected the subborrowers within the allocated amount for each subproject in the Project Implementation Plan (PIP). But under the Third and the Fouth Project, TU gave COs a package ceiling as much as possible without sub-allocation by subprojects.

(d) The minimum financial rate of return to the subproject should be over 10%

Actual repayment periods of subprojects approved :

Subprojects	Grace period	Repayment period	Total loan period
		Years	
Greenhouse	1	5	6
Upland irrigation			
- Vegetable	3	4	7
- Orchard	5	5	10
On-farm storage	1	6	7
Orchard development			
- Grapes, jujube, plum	5	4	9
- Pear, sweet persimmon	6	4	10
- Citron	4	4	8
- Orchard facilities	4-6	4	8-10
Farm machinery			
- Speed sprayer			
Large size	-	5	5
Small size	-	7	7
- Fruit sorter	-	5	5
- Power mower	-	3	3
Special crops			
- Oyster mushroom	1	5	6
- Oak mushroom	2	3	5
- Omeeja fruit	2	3	5
- Deodug root	2	2	4
- Ginseng	-	3	3
Beekeeping	2	3	5
Primary coop's Oil service center	3	4	7

(e) Under the Project, the methods and procedures of appraisal on farmer's loan applications and supervision of subloans were adjusted to the increased volume of subloans and diversities of subprojects. The main adjumstments were as follows :

1) For the patternized subprojects, individual financial analysis was not required, LAO assumed the same rate of return to all similar subprojects and applied the same period of repayment to all subloans as the patternized standard farm models developed by TU or regionally developed by LAO. But LAO took responsibility to appraise all the investment plans and subloan amounts on an individual basis even under the patternized analysis system.

2) The individual analysis was required for the applications for the non-patternized subprojects

3) LAO assessed the applicant's credit worthiness according to the methods and prcedures generally applied in NACF credit operations.

(f) The amount of a subloan was limited to not exceeding 70% of investment cost.

D. Training and education activities.

3.07 Under the Fourth Project, TU provided a series of training program for LAOs every year. During the period of 1985-1987, total participanting LAOs of participating county branch offices were 319 persons - 95 in 1985, 113 in 1986, 111 in 1987. The contents of the training included i) each year's project implementation plan and loan regulations ii) project implementation guidelines by subprojects ; and iii) loan appraisal criteria and methods which enhanced LAO's ability and enabled them to implement the Project in good order.

3.08 During the same period, NACF provided farmers with up-to-date farming technology for cash crops such as greenhouse, mushrooms, floral farming, fruits, livestock, medicinal herbs etc. under the Farming Technique Assistance Program. Many of these cash crops are the same kinds of subprojects under the Fourth Project.

These training courses, called the New Farmers Technical College, have been contributing to the rapid diffusion of high farming technology and the enhancement of farm income The participants by courses during the Project period were as follows:

Participants by courses

Courses	Participants			
	1985	1986	1987	Total
Greenhouse	430	265	356	951
Mushroom	428	359	308	1,095
Floral farming	163	118	137	418
Apple	96	101	103	300
Pear	-	-	89	89
Grapes	98	188	164	450
Peach	-	82	50	132
Ginseng	-	205	99	304
Herbs	-	-	172	172
Total	1,215	1,318	1,378	3,911

E. Project Monitoring

3.09 Monitoring is the provision of information and the use of information, to enable management group to assess progress of implementation and to take timely decisions to ensure that progress keeps according to schedule. For this purpose, during the Project implementation period, TU collected necessary reports on project implementation progress as follows :

TU collected :

1) Annual survey report on farmers' loan demand to know how may farmers want what kinds of investments (subproject) and to gather information for preparing Project Implementation Plan (PIP) and discuss the PIP with MAFF, and the Bank if necessary.

2) Semimonthly reports on the Project progress to know number and amount of loans made and to apply to the Bank for withdrawal of the Bank loan. This report was collected by NACF's on-line(EDPS) system.

3) Monthly reports on progress of the Projects under Foreign Loan Office of NACF from COs, which mentioned all kinds of Projects by foreign loan including Project by the Bank Loan.

3.10 To achieve the purpose of efficient Project implementation of Project participating COs and technical extension services for individual farmers, TU members visited 1,212 farms and a total of 130 participating COs of NACF to check their progress, TU also held regional seminars on farming technique during Project implemntation period as follwos :

Actual Result of TU's Field Trips

Year	Man-days	Total Number Visited	
		PCO	Farmer
1985	20	12	117
1986	80	47	470
1987	101	58	580
1988	28	13	45
Total	229	130	1,212

Actual Result of Farmer Technical Education

Year	Man-days	PCO	No, of farmers	Subproject
1987	2	2	744	-. Orchard development _ Special crops
1988	(3)	(3)	(900)	(Prearrangement)

3.11 The proper provision of extension services was an essential element in ensuring reasonable investments and operation on the farm. But county offices did not have, in general, an extension worker for technical services for farming. The technical and extension services to farmers in Korea are under the responsibility of the Office of Rural Development (ORD) Korea. However, special coops. and a limitted number of primary coops provide their nember farmers with more intensive extension support in horticulture and a certain kind of farming work, using their own specialist staff member. Even though county offices had not their own staff-member for technical servies, they were requested to help farmers through proper extension services with a budget that was earmarked annually for the extension services for participating farmers.

3.12 Scope of extension services of participating COs.

Participating COs :

1) Made farm-visits and then gave advice to farmers by specialists from agricultural colleges, ORD and/or advanced farmers who were invited by the participating COs.

2) Organized study groups for observation of technically advanced farms.

3) Organized seminars or lectures on special farming techniques.

4) Organized farming groups led by leading farmers.

F. Project performance

Fund disbursement

3.13 Actual disbursements in detail during the Project period were as follows :

In US $ million

Period by year	Number of farmers	Disbursements cumulative	
		Appraisal	Actual
Dec. 31, 1985	6,072	5.0	5.0
Jun. 30, 1986	2,920	5.0	12.0
Dec, 31	3,894	8.5	16.0
Jun. 30, 1987	2,549	12.0	19.6
Dec. 31	3,005	16.0	23.1
Jun. 30, 1988	-	20.0	25.0
Dec. 31		22.5	
Jun. 30, 1989		25.0	
Total	18,440	25.0	25.0

3.14 By the end of 1987, Government had lent W 17,500 million to NACF for the Project at annual interest rate of 7.0% with the repayment period of 12 years including 2 years of grace period.

Dates of disbursements	Amount (W million)
Feb. 28. 1986	3,300
Jul. 22. 1986	3,000
Oct. 31. 1986	2,000
Aug. 7. 1987	2,300
Sep. 30. 1987	2,300
Dec. 17. 1987	4,600
Total	17,500

* Until the end of 1987, NACF had lent farmers government fund a total of W 15,437 million.
The unused government fund (W 2,063 million) was carried forward to next year to make loans for farmers in 1988.

3.15 Annual financed subloans by subprojects

In million Won

Subproject	1985		1986		1987		Total		%
	No. of farmers	Loan amount	No. of farmers	Loan amount	No. of farmers	Loan amount	No. of farmers	Loan amount	
Greenhouse	4,649	8,744	3,560	4,406	4,832	10,695	13,041	23,845	64.6
Upland irrigation									
- Vegetable	83	216	48	118	35	97	166	431	1.2
- Orchard	53	221	67	264	84	332	204	817	2.2
On-farm storage	52	242	109	515	87	539	248	1,296	3.5
Orchard development									
- Grapes	253	401	67	141	6	30	326	572	1.5
- Peach	34	50	69	209	1	1	104	260	0.7
- Sweet persimmon	98	202	43	160	145	422	286	784	2.1
- Apple	11	31	40	112	130	512	181	655	1.8
- Pear	-	-	15	15	11	49	26	64	0.2
- Jujube	119	120	38	121	50	170	207	411	1.1
- Plum	-	-	3	9	34	57	37	66	0.2
- Citron	-	-	-	-	16	37	16	37	0.1
- Orchard facilities	11	14	46	197	-	-	57	211	0.6
Farm machinery									
- Speed sprayer	31	211	39	143	12	60	82	414	1.1
- Fruit sorter	1	2	-	-	-	-	1	2	0.0
- Power mower	-	-	3	3	2	2	5	5	0.0
Special crops									
- Oyster mushroom	122	269	382	947	42	92	546	1,308	3.5
- Oak mushroom	248	849	255	964	9	74	512	1,887	5.1
- Omeeja fruit	40	87	2	10	-	-	42	97	0.3
- Deodug root	48	63	122	166	1	3	171	232	0.6
- Ginseng	-	-	1,769	1,965	-	-	1,769	1,965	5.3
Beekeeping	219	308	72	84	16	24	307	416	1.2
Primary coops oil service center	-	-	65	741	41	388	106	1,129	3.1
Total	6,072	12,030	6,814	11,290	5,554	13,584	18,440	36,904	100.0

3.16

The Project cost

Detail of the total Project cost by subproject categories

In million Won

Subproject categories	Estimated cost (appraisal)					Actual cost (result)				
	Total	%	The Bank	Gov't fund	Subborrowers' contribution	Total	%	The Bank	Gov't fund	Subborrowers' contribution
Production facilities	14,400	32	6,480	3,600	4,320	53,777	92	19,927	14,131	19,719
Farm machinery & equipment	13,600	31	6,120	3,400	4,080	610	1	226	195	189
Marketing facilities	6,400	15	2,880	1,600	1,920	1,934	4	716	580	638
Input supply faclities	2,400	5	1,080	600	720	-	-	-	-	-
Agroprocessing facilities	2,400	5	1,080	600	720	-	-	-	-	-
Other nonfarm investments	5,200	12	2,360	1,300	1,540	1,613	3	598	531	484
Total	44,400	100	20,000 **	11,100	13,300	57,934	100	21,467 **	15,437	21,030
Ratio by resource mobilization	100%		45%	25%	30%	100%		37%	27%	36%

Note : * Other nonfarm investments represent primary coops' oil service center for farm machinery.

** The financing plan provides for a Bank loan of US$ 25 million, amounting to 45% of Project costs equivalent to W 20,000 million estimated by average foreign exchange rate (US$1= W 799), but actual disbursed amount reached W 21,467 million by each actual foreign exchange rates (US$= W859 in average) and this extra amount made NACF can afford more financing for farmers eventually. On the other hand, GOK lent NACF W15,437 million while Subborrowers contributed W21,030 million for the Project. All these made it possible that NACF loan more money for farmers. And so the total cost was overrun.

Cost summary

In million Won

	Appraisal				Actual			
	Local (55%)		Foreign (The Bank)	Total	Local (63%)		Foreign (The Bank)	Total
	NACF	Subborrower			NACF	Subborrower		
Amount	11,100	13,300	20,000	44,400	15,437	21,030	21,467	57,934
%	25	30	45	100	27	36	37	100

The actual average subloans per farmer by subproject

Subprojects	Number of farm households	Subloans (million Won)	
		Total amount	Average amount per farmer
Greenhouse	13,041	23,845	1.8
Upland irrigation			
- Vegetable	166	431	2.6
- Orchard	204	817	4.0
On-farm storage	248	1,296	5.2
Orchard development			
- Grapes	326	572	1.8
- Peach	104	260	2.5
- Sweet persimmon	286	784	2.7
- Apple	181	655	3.6
- Pear	26	64	2.5
- Jujube	207	411	2.0
- Plum	37	66	1.8
- Citron	16	37	2.3
- Orchard facilities	57	211	3.7
Farm machinery			
- Speed sprayer	82	414	5.0
- Fruit sorter	1	2	2.0
- Power mower	5	5	1.0
Special crops			
- Oyster mushroom	546	1,308	2.4
- Oak mushroom	512	1,887	3.7
- Omeeja fruit	42	97	2.3
- Deodug root	171	232	1.4
- Ginseng	1,769	1,965	1.1
Beekeeping	307	416	1.4
Primary coops oil service center	106	1,129	10.7
Total	18,440	36,904	2.0

The average investment size of the subprojects
(farm size)

Subprojects	Unit	Actual	Model farm
Greenhouse	ha	0.1	0.1
Orchard development			
- Grapes	ha	0.5	1
- Peach	ha	0.9	1
- Sweet persimmon	ha	1.6	1
- Apple	ha	2.0	1
- Jujube	ha	0.7	1
On-farm storage	pyong	28	20
Upland irrigation			
- Vegetable	ha	2.0	1
- Orchard	ha	1.8	1
Farm machinery	EA	1	1
Special crops			
- Oyster mushroom	pyong	86	50
- Oak mushrrom	Thou. logs	7.8	10
- Ginseng	pyong	590	300
Beekeeping	swarm	17	20

Distribution of loans made by loan size

Subprojects	Less than W1 million		W1 millions ~ W2 millions		W2 millions ~ W3 millions		More than W3 millions		Total	
	No.of farmers	Ratio %	No.of farmers	Ratio %	No.of farmers	Ratio %	No.of farmers	Ratio %	No.of farmers	Ratio %
Greenhouse	652	5	2,217	17	4,825	37	5,347	41	13,041	100
Upland irrigation		-		-	111	30	259	70	370	100
On-farm storage		-	7	3	32	13	209	84	248	100
Orchard development	293	24	446	36	173	14	328	26	1,240	100
- Grapes	82	25	130	40	33	10	81	25	326	100
- Peach		-	52	50	10	10	42	40	104	100
- Sweet persimmon	40	14	163	57	43	15	40	14	286	100
- Apple		-	15	8	25	14	141	78	181	100
- Jujube	130	63	52	25	25	12		-	207	100
- Others *	41	30	34	25	37	27	24	18	136	100
Farm machinery	-	-	-	-	-	-	88	100	88	100
Special crops	554	18	1,011	33	487	16	988	33	3,040	100
- Oyste mushroom	44	8	115	21	229	42	158	29	546	100
- Oak mushroom		-	15	3	138	27	359	70	512	100
- Deodug root	56	33	56	33	38	22	21	12	171	100
- Ginseng	442	25	814	46	71	4	442	25	1,769	100
- Omeeja fruit	12	30	11	25	11	25	8	20	42	100
Beekeeping	83	27	224	73		-		-	307	100
Oil service center		-		-		-	106	100	106	100
Total	1,582	9	3,905	21	5,628	30	7,325	40	18,440	100

*. others represent plum, citron, pear and orchard facilities.

3. 17 Total investment cost of the Project is estimated to be ₩57,934 million in which 64% of the total cost was financed by NACF; Farmers contributed 36% of total cost on average. The details of investment portion of each subproject are as follows:

Breakdown of Project financing by subproject

In million Won

Subprojects	Investment cost	Loan		Farmer's contribution	
		Amount	%	Amount	%
Greenhouse	36,128	23,845	66	12,283	34
Orchard development	4,527	3,060	68	1,467	32
- Grapes	841	572	68	269	32
- Peach	382	260	68	122	32
- Sweet persimmon	1,170	784	67	386	33
- Apple	963	655	68	308	32
- Pear	94	64	68	30	32
- Jujube	613	411	67	202	33
- Plum	97	66	68	31	32
- Citron	53	37	69	16	31
- Orchard facilities	314	211	67	103	33
Onfarm storage	1,934	1,296	67	638	33
Upland irrigation	1,835	1,248	68	587	32
- Veagetable	634	431	68	203	32
- Orchard	1,201	817	68	384	32
Farm machinery	610	421	69	189	31
- Speed sprayer	600	414	69	186	31
- Fruit sorter & mower	10	7	69	3	31
Special crops	10,666	5,489	51	5,177	49
- Oyster mushroom	1,952	1,308	67	644	33
- Oak mushroom	3,043	1,887	62	1,156	38
- Ginseng	5,171	1,965	38	3,206	62
- Omeeja fruit	149	97	65	52	35
- Deodug root	351	232	66	119	34
Beekeeping	621	416	67	205	33
Primary coop's oil	1,613	1,129	70	484	30
Service center					
Total	57,934	36,904	64	21,030	36

3.18 The total of 125 participationg county offices (PCO) of NACF participated under the 4th Project among NACF's 139 county offices

PCOs under the 1st Project : 59 (42%)
PCOs under the 2nd Project : 105 (75%)
PCOs under the 3rd Project : 127 (91%)
PCOs under the 4th Project : 125 (90%)

Number of PCOs under the Project

Subprojects	1985	1986	1987	Total
Greenhouse	73	62	63	82
Upland irrigation				
- Vegetable	6	2	1	6
- Orchard	8	9	12	10
On-farm storage	22	16	19	28
Orchard development				
- Grapes	16	11	4	17
- Peach	8	9	1	10
- Sweet Persimmon	9	6	10	10
- Apple	3	5	20	21
- Pear	-	1	1	1
- Jujube	3	5	11	12
- Plum	-	1	1	2
- Citron	-	-	2	2
- Orchard facilities	2	5	-	6
Farm machinery				
- Speed sprayer	15	15	6	17
- Fruit sorter	1	-	-	1
- Power mower	-	2	2	2
Special crops				
- Oyster mushroom	15	26	1	31
- Oak mushroom	20	26	1	28
- Omeeja fruit	7	1	-	7
- Deodug root	1	6	-	6
- Ginseng	-	17	3	18
Beekeeping	26	3	4	27
Primary coops oilservice center	1	31	1	31
total	96	124	98	125

Status of loans made by each province

In million Won

Province. / Subrprojects / Number of farmers	Gyunggi	Gang-weon	Chung-buk	Chung-nam	Jeon-buk	Jeon-nam	Gyeong-buk	Gyeong-nam	Jeju	Pusan	Taegu	Others	Total
	321	58	631	1,624	2,273	3,358	7,125	2,406	601	28	7	8	18,440
Greenhouse	329	66	79	1,756	2,155	4,800	7,634	5,002	1,780	176	33	35	23,845
Upland irrigation													
- Vegetable	-	-	-	4	1	415	11	-	-	-	-	-	431
- Orchard	17	-	4	20	12	12	742	10	-	-	-	-	817
On-farm storage	46	3	37	316	54	17	507	15	301	-	-	-	1,296
Orchard development													
- Grapes	13	14	70	186	67	167	24	29	-	-	-	2	572
- Peach	5	2	59	87	67	14	26	-	-	-	-	-	260
- Sweet persimmon	-	-	-	-	-	574	3	207	-	-	-	-	784
- Apple	20	1	32	250	37	-	315	-	-	-	-	-	655
- Pear	-	-	-	11	-	-	-	53	-	-	-	-	64
- Jujube	14	-	156	6	53	70	105	7	-	-	-	-	411
- Plum	-	-	-	-	-	66	-	-	-	-	-	-	66
- Citron	-	-	-	-	-	30	-	7	-	-	-	-	37
- Orchard facilities	-	-	20	90	8	93	-	-	-	-	-	-	211
Farm machinery													
- Speed sprayer	99	3	46	154	3	51	55	3	-	-	-	-	414
- Fruit sorter	-	-	-	2	-	-	-	-	-	-	-	-	2
- Power mower	-	-	1	3	-	-	1	-	-	-	-	-	5
Special crops													
- Oyster mushroom	264	42	5	111	154	694	9	20	-	4	5	-	1,308
- Oak mushroom	68	-	24	536	456	182	196	366	59	-	-	-	1,887
- Omeeja fruit	2	-	-	2	48	-	22	-	23	-	-	-	97
- Deodug root	8	-	18	-	63	71	72	-	-	-	-	-	232
- Ginseng	-	-	456	365	850	-	273	21	-	-	-	-	1,965
Beekeeping	-	24	2	9	34	77	75	49	146	-	-	-	416
Primary coop's oil service center	145	60	22	94	240	282	157	129	-	-	-	-	1,129
Total	1,030	215	1,031	4,002	4,302	7,615	10,227	5,918	2,309	180	38	37	36,904

IV Project result and evaluation

A. Information collecting system

4.01 For collecting available information on the Project result to evaluate Project performance, TU decided to use a sample survey method and reports submitted by LAOs of county offices of NACF.
According to the data collected from reports by county offices of NACF, TU calculated and analysed the volume of input and output of the Project result. And in order to get actual Project effect, TU calculated and analysed the data collected by sample survey method.

Sample survey method

4.02 In consideration of the available manpower and cost, TU decided to use sample survey method like the post evaluation report of the Third Agricultural Credit Project previously submitted to the Bank by TU. For sampling, TU selected number of sampling farms first, to survey in order to evaluate the actual effect of the subprojects and then divided the whole fixed number of sampling farms into two parts, one is the part where TU visited every farm directly to collect information, the other is the part where TU collected information by questionnaire which were sent to farmers by mail and vice versa. The number of sampling farms were settled by the statistical sampling method that used as a formula for the sample survey in the previous evaluation report of the Third Agricultural Credit Project 1974-KO.

The formula is :

$$n = \frac{N}{1 + N\left(\frac{D}{K\,C}\right)^2}$$

N : Total farm households (total number of subborrowers)
n : number of sampling farms
K : 2 (constant when the credit worthiness rate represents 95%)
D : 0.05 (relative discrepancy)
C : 0.26 (variable coefficient)

Table of sampling

Subprojects	Total participating farmers				Number of samples
	1985	1986	1987	Total	
Green house	4,649	3,560	4,832	13,041	99
Up-land irrigation					
- Vegetable	83	48	35	166	62
- Orchard	53	67	84	204	66
On-farm storage	52	109	87	248	71
Orchard development					
- Grapes	253	67	6	326	76
- Peach	34	69	1	104	50
- Sweet persimmon	98	43	145	286	74
- Apple	11	40	130	181	64
- Jujube	119	38	50	207	67
Farm machinery					
- Speed sprayer	31	39	12	82	45
Special crops					
- Oyster mushroom	122	382	42	546	84
- Oak mushroom	248	255	9	512	83
- Deodug root	48	122	1	171	63
- Ginseng	-	1,769	-	1,769	94
Beekeeping	219	72	16	307	75
Others *	52	134	104	290	-
Total	6,072	6,814	5,554	18,440	1,073

* Other subprojects are;pear, plum, citron, orchard facilities, fruit sorter, power mower and omeeja. These subprojects were excluded because their loan amount was under 2% as a whole in total loan amount.

Detail of sampling method

4.03 To collect information from farmers, TU visited more than 10% of sampling farms and for the remainder TU sent questionnaire to each of sampling farms.

Subprojects	Number of sampling farms	Information collecting method			
		Direct		Indirect	
		number of farms	visitor (TU)	number of farms	send * questionnaire
Greenhouse	99	20	D.S. LEE	79	119
Upland irrigation					
- Vegetable	62	6	B.Y.KIM	56	84
- Orchard	66	7	"	59	88
On-farm storage	71	7	"	64	96
Orchard development					
- Grapes	76	8	"	68	102
- Peach	50	5	"	45	68
- Sweet persimmon	74	8	"	66	99
- Apple	64	7	"	57	85
- Jujube	67	7	"	60	90
Farm machinery					
- Speed sprayer	45	9	Y.C.KIM	36	54
Special crops					
- Oyster mushroom	84	12	M.S.SHIN	72	108
- Oak mushroom	83	12	"	71	106
- Deodug root	63	9	"	54	81
- Ginseng	94	14	"	80	120
Beekeeping	75	15	Y.C.KIM	60	90
Total	1,073	146		927	1,390

* Copies of questionnaires were sent to farmers 1.5 times as many as the number of farms for indirect collecting information in considering of no reply from farms.

B. Investment in the Project

4.04 The details of Project investment are :

Total invested cost : 57,934 million Won

The Bank : 21,467 million Won

Gov't of Korea : 15,437 million Won

Farmers : 21,030 million Won

Financed status of the Project

In million Won

Subprojects	Total invested cost		Financed loan		Subborrower's investment	
	Amount	%	Amount	%	Amount	%
Greenhouse	36,128	100	23,845	66	12,283	34
Upland irrigation	1,835	100	1,248	68	587	32
On-farm storage	1,934	100	1,296	67	638	33
Orchard development	4,527	100	3,060	68	1,467	32
Farm machinery	610	100	421	69	189	31
Special crops	10,666	100	5,489	51	5,177	49
Beekeeping	621	100	416	67	205	33
Oil service center	1,613	100	1,129	70	484	30
Total	57,934	100	36,904	64	21,030	36

* In 1985 NACF subloaned farmers W12,030 millions including NACF fund of W7,973 millions which had been collected W6,801 millions in 1986 and W1,172 millions in 1987. Please refer to annexed Table 1.

Distribution of Loan by subprojects

In million Won

Subprojects	Appraisal (A)		Actual (B)		B/A
	Amount	%	Amount	%	(%)
1. Production facilities	14,400	32	34,058	92	236.5
(A) Greenhouse			(23,845)	(64.6)	
(B) Upland irrigation					
- Vegetable			(431)	(1.2)	
- Orchard			(817)	(2.2)	
(C) Orchard development					
- Grapes			(572)	(1.5)	
- Peach			(260)	(0.7)	
- Sweet Persimmon			(784)	(2.1)	
- Apple			(655)	(1.7)	
- Pear			(64)	(0.2)	
- Jujube			(411)	(1.1)	
- Plum			(66)	(0.2)	
- Citron			(37)	(0.1)	
- Orchard facilities			(211)	(0.6)	
(D) Special crops					
- Oyster mushroom			(1,308)	(3.5)	
- Oak mushroom			(1,887)	(5.1)	
- Omeeja fruit			(97)	(0.2)	
- Deodug root			(232)	(0.6)	
- Ginseng			(1,965)	(5.3)	
(E) Beekeeping			(416)	(1.1)	
2. Farm machinery & equipment	13,600	31	421	1	3.1
- Speed sprayer			(414)	(1.1)	
- Fruit sorter			(2)	(0.0)	
- Power mower			(5)	(0.0)	
3. Maketing facilities	6,400	15	1,296	4	0.1
On-farm storage			(1,296)	(3.5)	
4. Input supply facilities	2,400	5	-		0.0
5. Agroprocessing facilities	2,400	5	-		0.0
6. Other nonfarm investment	5,200	12	1,129	3	0.1
- FC's oil service center			(1,129)	(3.1)	
Total	44,400	100	36,904	100	

4.05 During the Project period there were some fluctuation in the Project unit costs. The details of price fluctuation by year and subprojects are as follows :

Initial investment cost by subprojects

In thousand Won

Subprojects	Unit	Actual unit costs				87/85
		1985	1986	1987	Average	%
Greenhouse	0.1ha	3,560	3,560	3,095	3,405	87
Upland irrigation						
- Vegetable	1ha	1,734	1,734	1,840	1,769	106
- Orchard	1ha	2,737	2,737	2,941	2,805	107
On-farm storage	20pyong	7,290	5,490	8,760	7,180	120
Orchard development						
- Grapes	1ha	2,548	2,548	2,612	2,569	102
- Peach	1ha	1,717	1,247	1,247	1,403	72
- Sweet persimmon	1ha	1,569	1,367	1,483	1,473	94
- Apple	1ha	2,156	2,016	2,443	2,205	113
- Pear	1ha	1,332	1,282	1,750	1,454	131
- Jujube	1ha	2,147	1,974	2,426	2,182	112
- Plum	1ha	-	1,194	1,160	1,177	97
- Citron	1ha	-	-	1,386	1,386	100
- Orchard facilities	1ha	2,548	2,548	2,548	2,548	100
Farm machinery						
- Speed sprayer						
*Small size	ea	3,300	3,300	3,500	3,366	106
*Large size	ea	12,000	12,000	15,000	13,000	122
- Fruit sorter	ea	1,100	1,100	1,200	1,133	109
- Power mower	ea	1,000	1,200	1,700	1,300	170
Special crops						
- Oyster mushroom	50pyong	4,799	4,785	4,825	4,803	101
- Oak mushroom	5,000 logs	3,625	3,523	4,028	3,725	111
- Omeeja fruit	1ha	6,926	6,500	6,378	6,601	92
- Deodug root	0.1ha	-	1,292	1,292	1,292	100
- Ginseng	0.1ha	-	883	883	883	100
Beekeeping	10swarms	1,090	1,090	1,060	1,080	97

NOTE : 1. There are two kinds of items in the investment items of subprojects : Fundamental items and additional items, Actual unit cost means fundamental items only.
2. Orchard facilities mean branch supporting structures (prop), wiring and labor cost.
3. The Price of farm machinery is the price of middle priced one.
4. For ginseng, the price of nursery roots is not included.

C. The Project effect

4.06 The actual effect of the Project was calculated on the basis of TU's sample survey and data from MAFF, Office of Rural Development Korea and Korea Beekeeping Association. The actual Project effects of each Subproject are as follows:

The actual Project effect

Subprojects	Size of farm model	Full developed year*1	Yield*2 per farm model(A)	Implemented acreage (B)	Annual Total production (A x B)
Greenhouse	0.1ha	1987	2.38M/T	1,630ha	38,794M/T
Upland irrigation					
- Vegetable	1ha	1987	13.4M/T	343ha	4,596M/T
- Apple orchard	1ha	1994	2.0M/T	368ha	736M/T
On-farm storage (apple)	20pyong	1991	(30.0M/T)*3	6,937pyong	(10,405M/T)*3
Orchard development					
- Grapes	1ha	1994	18M/T	172ha	3,096M/T
- Peach	1ha	1995	17M/T	94ha	1,598M/T
- Sweet persimmon	1ha	1996	10M/T	471ha	4,710M/T
- Apple	1ha	1995	35M/T	369ha	12,915M/T
- Jujube	1ha	1995	7.8M/T	157ha	1,224M/T
Special crops					
- Oyster mushroom	50pyong	1987	4M/T	15ha	3,600M/T
- Oak mushroom	5,000logs	1987	1,250kgs	4,005thou.logs	1,001M/T
- Deodug root	0.1ha	1987	417kgs	28ha	117M/T
- Ginseng	0.1ha	1990	346kgs	348ha	1,204M/T
Beekeeping	10boxes	1990	250kgs	5,194boxes	130M/T
Total					73,721M/T

NOTE * 1. Initial year : 1986

* 2 Yields per farm model of subprojects were calculated as follows :

a. Greenhouse : Total Area : 21,000ha ('88 MAFF's statistics)

Yield : 500,000M/T(")

Therefore 23.8 M/T per ha and 2.38 M/T per 0.1 ha.

b. Upland irrigation : The difference of yield guantity between with-project and without-project. (Vegetable : double cropping)

c. On-farm storage : The storage capacity of apple per 1pyong is 1,500kgs. Consequently, 20pyong flooring storehouse can store 30,000kgs (30M/T)

d. Orchard development : The yields of grapes, peach and sweet persimmon are the yields of full developed year of orchards.

e. Special crops :

- Oyster mushroom : Yield per 1pyong of 1 cropping is 40kgs. Oyster mushroom farming usually has double cropping in a year. Accordingly, 40kgs x 50pyong x 2 = 4,000kgs(4M/T)
- Oak mushroom : Annual average yield per 5,000logs is 1,250kgs.
- Deodug root : Annual average yield per 0.1ha is 417kgs.
- Ginseng : Ginseng fields usually produce 346kgs of ginseng roots per 0.1ha in the 4th farming year (full developed year) (office of Rural Development,Korea)

f. Beekeeping : One swarm box of honey bees usually produce 25kgs of honey in a year (Korea Beekeeping Association)

* 3 The quantity of stored fruits is shown in the on-farm storage column

The actual Project effect in value

Subprojects	Full development year	Implemented acreage or volume	Net benefit (in thou. Won) per unit*	Total
Greenhouse (cucumber)	1987	1,630ha	0.1ha- 837	13,643,100
Upland irrigation				
- Vegetable	1987	343ha	1ha-1,082	371,126
- Apple orchard	1994	368ha	1ha-3,576	1,315,968
On-farm storage (apple)	1991	6,937pyong	20pyong-1,273	441,540
Orchard development				
- Grapes	1994	172ha	1ha-3,893	669,596
- Peach	1995	94ha	1ha-5,837	548,678
- Sweet persimmon	1996	471ha	1ha-6,449	3,037,479
- Apple	1995	369ha	1ha-21,801	8,044,569
- Jujube	1995	157ha	1ha-10,890	1,709,730
Special crops				
- Oyster mushroom	1987	15ha	50pyong-991	891,900
- Oak mushroom	1987	4,005thou. logs	5,000logs-1587**	1,271,187
- Deodug root	1987	28ha	1ha-643**	18,004
- Ginseng	1990	348ha	0.1ha-5,402	18,798,960
Beekeeping	1990	5,194boxes	10bex-654	339,688
Total				51,101,525

* The figures of net benefit (total benefit - total cost) per unit of each subproject are the same figures of financial analysis in full developed year's net benefit of each subproject.

** The net benefits of oak mushroom and deodug root are annual average benefits of each subproject.

The enlargement of annual employment opportunity by the Project.

Subprojects	Full developed Year	Unit of farm size	Annual necessary labor per unit of farm size (average) Man	Woman	Total	Expected total result Implemented acreage	Employment opportunity (manday)
Greenhouse	1987	* 10a	45	44	89	1,630ha	1,450,700
On-farm storage	1991	20pyong	30	50	80	6,937pyong	27,748
Orchard development							
- Grapes	1994	10a	26	12	38	172ha	65,360
- Peach	1995	10a	23	18	41	94ha	38,540
- Sweet persimmon	1996	10a	18	4	22	471ha	103,620
- Apple	1995	10a	22	13	35	869ha	304,150
- Jujube	1995	10a	8	6	14	157ha	21,980
Special crops							
- Oyster mushroom	1987	50pyong	20	160	180	15ha	162,000
- Oak mushroom	1987	5,000logs	20	20	40	4,005thou.logs	32,040
- Deodug root	1987	10a	14	15	29	28ha	8,120
- Ginseng	1990	10a	26	25	51	348ha	177,480
Total			252	367	619		2,391,738

* 10 a = 0.1 ha

D. Financial and economic analysis.

4.07 TU calculated financial rates of return(FRR) of each subproject to measure the financial viabilities of farm investments in 1987.
And also economic rates of return (ERR) of subprojects were calculated by adjusting financial prices to economic values.
In adjusting financial prices to economic values, TU used the standard conversion factors calculated according to the procedures of appropriate adjustments for shadow price of foreign exchange, opportunity cost, taxes and subsidies.
The results of analysis on the subproject are as follows :

Subprojects	FRR	ERR	Subprojects	FRR	ERR
Greenhouse			Orchard development		
A. Single cropping			- Peach	30%	30%
- Cucumber	39%	33%	- Grapes	18%	18%
- Green Pepper	50%	50%	- Sweet persimmon	26%	26%
- Tomato	48%	42%	- Plum	38%	38%
- Strawberry	29%	22%	- Jujube	37%	36%
- Pumpkin	15%	13%	On-farm storage	18%	17%
- Oriental melon	50%	50%	Upland irrigation		
- Chrysanthemum	39%	34%	- Movable sprinkler	50%	50%
B. Double cropping			- Fixed sprinkler	50%	50%
- Cucumber green pepper	50%	50%	Farm machinery		
- Oriental melon water melon	50%	50%	- Speed sprayer	22%	14%
- Pumpkin green pepper	25%	31%	- Power mower	29%	17%
- Lettuce cucumber	18%	21%	Special crops		
- Chrysanthemum tomato	50%	50%	- Ginseng	26%	26%
			- Oyster mushroom	24%	22%
			- Oak mushroom	30%	28%
			- Deodug root	23%	20%
Orchard development			- Omeeja fruit	21%	22%
- Apple	38%	39%	- Kookija fruit	41%	34%
- Pear	19%	20%	Beekeeping	34%	34%

*The standard conversion factors are :

Capital goods	:	0.94
Consumption goods	:	0.89
Farm labor	:	0.82

4.08 Nearly 70% of the subloans financed were for farmers who had farming acreage under 1ha : greenhouse 67%, upland irrigation 35%, grape 88% sweet persimmon 93%. oyster mushroom 63%, oak mushroom 72%, beekeeping 45%,and total Project 67%. No. of subloans and loan amount by farm size were as follows:

Farm size before Project (ha)	No.of subloan	Loan amount (million Won)	Average size of subloan (W'000)	% of subloan number	% of loan amount
less than 0.5	4,380	9,338	2,131	24	25
0.5 - 1	7,630	15,606	2,045	41	42
1 - 2	5,197	9,264	1,782	28	25
2 - 3	1,051	2,144	2,039	6	6
over 3	182	552	3,032	1	2
Total	18,440	36,904	2,001	100	100

Subloans made by farm size of main subprojects are explained on table 6.

4.09 Average size of subloans was W2,000,000 for each farmer. Subloans were broken down into loan size, namely,less than 1 million Won, 1-2, 2-3, over 3 million Won,Almost 80%of the subloan had been under 3 million Won in loan size. No. of subloan and loan amount by loan size are as follows :

Loan size (million Won)	No. of subloan	Loan amount (million Won)	% of subloan number	% of loan amount
less than 1	1,725	733	9	2
1 - 2	6,930	8,929	38	24
2 - 3	5,904	13,157	32	36
over 3	3,881	14,085	21	38
Total	18,440	36,904	100	100

Subloans made by loan size of main subprojects are explained on table 7.

V. The performance of the parties concerned

5.01 NACF has been able to implement the Project successfully thanks to its long term experience, its member farmers' aggressive efforts forward the establishment of high income and welfare villages and especially the faithful performance of duties by all three parties - NACF, the government of Korea and the Bank - as follows

A. NACF

5.02 Semiannual Progress Report: In accordance with the provision of section 2.07(b) of the Project Agreement, NACF regularly furnished to the Bank the report at semiannual intervals covering the progress of Project implementation, activities of T.U., Project implementation plan, the operational news of NACF and all the other information in detail.

5.03 Maintenance of Technical Unit (TU) : Established under the First Agricultural Credit Project (Loan no. 335 KO), the Technical Unit has been maintained under the structure of NACF and will be maintained even after the IBRD Loan has been fully disbursed.

5.04 Audit Report : Pursuant to section 4.02 of the Project Agreement, NACF has its accounts and financial statements and the Special Account audited by independent auditors three times for the fiscal year 1985 , 1986, 1987. Each time, the audit reports on the statements of Project account and financial statements and supplementary information have been furnished to the Bank within the required time limit.

5.05 The measures for improving financial condition : NACF were to implement the measures for improving its financial condition in accordance with Section 4.03 of the Project Agreement. However, the main reason for financial losses in 1982 and 1983 was that the government had reduced interest rates on loans and deposits but the reduced rates applied to all outstanding loans and only to new deposits. These negative spread on lending had been gradually solved according to the flow of time and NACF's financial condition had been improved as follows without special measures

* Net Earnings of NACF

(In billion Won)

Year	1982	1983	1984	1985	1986	1987
Net Earnings	(55)	(11)	15	7	5	18

Sources : Audit report by the independent auditors

B. The government of Korea

5.06 The support for NACF's financial condition : Pursuant to section 3.04 of Loan Agreement and section 4.03 of Project Agreement, the borrower, in consultation with NACF, informed the Bank, on December 26, 1986, that the financial condition of NACF had been improved significantly in its recent history, so further government support for NACF was unnecessary at this time. The Bank accepted, on February 13, 1987, that proposal on the condition that should there be an adverse change in NACF's financial condition, the Government would carry out a comprehensive review and discuss appropriate measures with the Bank. As there has been no adverse change since that time, additional government support for NACF has not been necessary by now.

5.07 The measures against the foreign exchange risk of the Loan : The government provided NACF with 21.9 billion Won for the purpose of protectiong NACF and sub-borrowers against the foreign exchange risk of the Loan in accordance with Schedule 4 of the Loan Agreement.

5.08 The clearance of the foreign exchange risk of the Loan : The foreign exchange risk has been cleared semiannually(June 15, December 15) by the interest accrued from the above mentioned government fund - 21.9 billion Won. The amount of the foreign exchange risk of the Loan incurred and cleared by year is 156 million Won in 1986, 183 million Won in 1987 and 186 million Won in 1988 (as of june 15) respectively.

5.09 As reported through our first semi-annual Progress report in 1987, the government took comprehensive measures on the rural community's debt problem as of March 16, 1987 in which the interest rate of the subloans to farmers under the IBRD Loan of NACF has been reduced to 8% per annum. The losses to NACF incurred in 1987 due to this measures amounted to 2,315 million Won, all of which has already been compensated by the government in 1988. The losses to NACF incurred every year in the future will be compensated every next year by the government.

5.10 The government also took the additional measures as of December 9, 1987, in which the sub-borrowers under the IBRD Loan of NACF have been allowed to repay their loans in installments over a period of seven years after a five-year grace period. According to this additional measures, NACF had received the sub-borrowers' application of a five-year grace period and a seven-year repayment by September 30, 1988 and thereby 22, 602 million Won, 61% of the total subloans, was asked to be post poned by 12, 013 subborrowers in the end.
In Response to those measures, the government allowed NACF to repay the government fund in installment over a period of seven years after a five-year grace period in the same condition as subloans.

C. The World Bank

5.11 A wide range of assistance and cooperation between the Bank and NACF has been made during the Project implementation period. Furthermore, the Bank sent mission to NACF four times during the implementation period of the Project and wide exchange of views and extensive discussions took place in amicable atmosphere.

5.12 The first mission, Mr. Deshpande and Mr. Earwaker, visisted NACF from October 16 to October 18, 1985 to supervise the implementation of the Project. They reviewed the survey of subloan demand, a Project familiarization program for Loan Appraisal Officers and detailed guidelines on subloan appraisal etc. and were satisfied with those preparation. The mission were much interested in the proposed government loan to compensate NACF for the estimated foreign exchange risk on the Bank loan and emphasized Korean government should, in consultation with NACF,carry out a comprehensive review of NACF's financial condition and propose measures to improve its financial performance according to Loan Agreement.

5.13 The second mission, Mr. Earwaker, visited Korea from June 23, to July 5, 1986. He discussed with TU staff the matters arising from the Project including estimated disbursements of loan and government loan. We had also talked about the possibility of the new loan for the new agricultural project.

5.14 The third mission, Ms. Hill, visited NACF from December 4 to December 12, 1986, to supervise the implementation of the Project. The mission evaluated that Project implementation was going well and NACF's financial condition continued to improve. We also discussed the reduction of interest rate from 12% to 11.5 % per annum

5.15 The fourth mission, Mr. Berg, visited NACF from November 19. to November 29, 1987, to supervise the Project implementation. The mission discussed with T.U, staff on various matters arising from the Project and performed a widespread field trip to look into the progress of the Project in the field. After supervising the Project progress, the mission was fully satisfied with the performance in managing the Preject. He also discussed with EPB, MOF, MAFF, KREI etc. to prepare new project on the agriculture and rural development. It was proposed that IBRD would provide assistance in preparing and formulating i) a comprehensive 4-5 year rural development project ii) appropriate investment policies iii) feasibility studies and a financing plan and iv) a medium term policy and development plan for further investments.

* EPB : Economic Planning Board.
* MOF : Ministry of Finance. (Korea)
* KREI : Korea Rural Economy Institute.

VI. Recovery Of Loan From Beneficiaries

6.01 The objective of this chapter is to describe how much amortized loans from beneficial farmers could not repay is and compare the 1st, 2nd, 3rd, 4th loan and revolving fund each other. We,the NACF, have calculate the delinquent loan ratio by way of getting divided the total balance by the delinquent loan. But the Bank wanted us to calculate it by being divided the due loan by the delinquent loan and we admit it as reasonable in order to compute the loan fallen due which sub-borrowers cou'd not repay during the year.

6.02 As shown in 6.03 chart, the delinquent ratio of the 4th loan, 3.6%,is lower than that of the 1st,2nd,3rd loan and revolving fund,31.9%, 47.6%,10.6%,5.6%, respectively. The reason why the amortized loan is much is because the sub-loan from beneficiaries was amortized prematurely. The reason why the 1st,2nd,3rd loan's delinquent ratio is higher than the 4th and due payment of those is more than that of the 4th project. High delinquent ratio of the 1st,2nd loan is attributed to the much delinquent loan before 1986. Even though apprehending the high delinquent ratio of the 4th loan with the lapse of time as much as other loans, because financial ststus of farmers has been much improved, we anticipate the amortizing wishfully.

6.03 Delinquent Ratio Of Loan To Be Amortized (Next Page)

Delinquent Ratio Of Loan To Be Amortized

(In million Won)

	Balance as of Dec.31,1987	Loan to be repaid in 1987			Amortized loan during 1987	Delinquent loan as of Dec.31,1987	Ratio of Delinquent loan
		Total	Delinquent loan as of Dec.31,1986	Due payment in 1987			
							%
First loan	148	113	104	9	102	36	31.9
Second Loan	572	391	356	35	373	186	47.6
Third Loan	27,676	7,819	2,836	4,983	8,288	828	10.6
Fourth Loan	33,853	2,028	-	2,028	2,077	72	3.6
Revolving Fund	9,794	556	12	544	493	31	5.6
Total	72,042	10,907	3,308	7,599	11,333	1,151	10.6

VII. Overall assessment

7.01 In consideration of the experience under the previous agricultural credit Projects,it was expected that the Bank Loan would be disbursed by the end of June,1989.
According to the estimated disbursement schedule of the Staff Appraisal Report of the World Bank , disbursement of the Bank Loan should be carried out by the 2nd semester of 1989, and The Loan Agreement provided that the Loan disbursement closing date should be March 31,1989. However the Project have been performed favorably and completed earlier than expected completion date. NACF thinks this resulted from the Bank's assistance,the help of Government and NACF's experiences of previous Bank-assisted Projects.

7.02 NACF subloaned to farmers and primary cooperatives for their investments in agricultural production facilities,farm machinery and equipment,storage facilities and other rural business opportunities to expand off-farm income sources. On the other hand there were various lacking for agro-business such as input manufacturing and supply,and agro-processing facilities because there was no farmer who wished to do such a venturous unknown agro-business.It seems that farmers' most favorite business is greenhouse development which was also very popular in the three previous Projects.And NACF also thinks that small farmers or unexperienced primary coops would not want to try input manufacturing and supply business or invest in agro-processing facilities.

7.03 The lending procedure and the way county coop select subprojects are the same as they were in the previous Third Agricultural Credit Projects. The subloan appraisal for investment projects have been carried out by LAOs in the same way as the previous Third Project. That is, LAOs surveyed and appraised every

investment project according to the representative models of 35 subprojects prepared by TU, In representative models, TU divided project investment items into two parts, one is fundamental items that are necessary for the subproject essentially and the other is additional items that are convenient for the subproject but not essential.

7.04 For the type of investment models different from the representative models,TU prepared LAO send that model to TU for approval. After appraising the technical feasibilities and financial validity of the model substantially,TU informed LAO the appraisal result. Finally LAO financed the subproject or not by the result from TU.

7.05 During the implementation period of the Project. 125 county offices (90%) among 139 offices participated the Project and many primary cooperatives were involved in the Project as would-be cooperative offices which recommended farmers for the subprojects and check the progress of each investment and payment of the subloan to subborrowers according to the progress, collect the interest of subloans and provided technical guidance. For these cooperation county offices often payed one percent of interest received from subborrowers in the respective region to primary coops concerned to cover their cost.

7.06 Nowadays we Koreans have plenty of vegetables on our tables at mealtime notwithstanding the season due to the Bank's help which enabled farmers to build sufficient greenhouses that grow every necessary vegetable for Koreans. Financed by the Bank, greenhouse subprojects as well as other subprojects have diversified rural income sources up to the present and they will continue in the future.

VIII. Lessons learnt

8.01 Under the Project, the beneficiary farmers had two access way to the farming technique guidance. One was through organized seminars for participated beneficiary farmers directly by PCOs,and the other was through the use of guidance channels held by NACF which was extended to all farmers through "The New Farmers Technique College."

Now and then, TU discovered some cases which participating farmers could not reach the full-fledged management level because of inadequate farming techniques and information.
Afterwards the guidance program should be enlarged,especially through field seminars organized by PCOs and their cooperation agencies such as primary cooperatives and local governments,which has been assessed as a very efficient guidance system for the maximization of the Project effect.

8.02 Actually,TU could not find a chance to finance farmers who work for marketing facilities or input manufacturing and supply fields. So,next time, TU should make efforts to find way to help farmers who work in these fields and make many member cooperatives to participate in the future projects too.

8.03 TU also made efforts to spread the Bank's advanced loan appraisal techniques " The Financial Analysis of Agricultural Project " over 15 years.
We have learned that staff of NACF is interested in this advanced technique developed by the Bank.
And in the near future, we believe, this advanced loan appraisal technique would be a regular subject for farmers and staff of coops in the training institutes of NACF.

IX. ANNEX

Tables

Financial and Economic Analyses of Subprojects.

* Special crops

* Beekeeping

Table 1

The actual fund raising status for the Project

(As of Feb. 29. 1988)

In million Won

Fund (resources)	1985	1986	1987	1988	Total
The Bank loan	4,057	9,791	6,161	1,458 *	21,467
(US$ '000)	(4,564)	(11,081)	(7,488)	(1,867)	(25,000)
(Disbursed ratio)	(18%)	(44%)	(30%)	(8%)	(100%)
Government fund	-	8,300	7,137	-	15,437
NACF fund **	7,973	-6,801	-1,172	-	0
Total	12,030	11,290	12,126	1,458	36,904

* The Bank loan withdrawn in Feb. 1988 is for the reimbursement of payments by NACF to finance the subprojects of 1987.
Consequently, W13,584 millions (12,126+1,458) had been financed for farmers in 1987.

** In 1985 NACF subloaned farmers W12,030 millions including NACF fund of W7,973 millions which had been collected W6,801 millions in 1986 and W1,172 millions in 1987.

Table 2

Status of withdrawal by subprojects and years

In US$'000

Subprojects	Amount withdrawn					
	1985	1986	1987	1988*	Total	%
Greenhouse	3,331	4,321	5,893	1,469	15,014	60
Upland irrigation	182	332	225	60	799	3
On-farm storage	92	498	300	75	965	4
Orchard development	319	943	704	176	2,142	9
Farm machinery	91	178	37	9	315	1
Special crops	456	3,989	97	22	4,564	18
Beekeeping	93	78	15	4	190	1
Oil service center	-	742	217	52	1,011	4
Total	4,564	11,081	7,488	1,867	25,000	100

* The withdrawal in Feb. 1988 is for the reimbursement of payments to finance the subprojects of Dec. 1987 by NACF.

Total investment cost of the Project

Table 3

(2-1)

In million Won

subprojects	Loan made			(B) Farmers' contribution	(C=A+B) Total investment	Loan ratio (A/C)	Per farmer	
	Number	Quantity	Amount(A)				Quantity	Amount
Greenhouse	13,041	1,630ha	23,845	12,283	36,128	66%	0.12ha	1.83
Sprinkler irrigation								
- Vegetable	166	343ha	431	203	634	68%	2.0ha	2.60
- Orchard	204	368ha	817	384	1,201	68%	1.8ha	4.00
On-farm storage	248	6,937 .pyong	1,296	638	1,934	67%	28.0평	5.23
Orchard development								
- Grapes	326	172ha	572	269	841	68%	0.5ha	1.75
- Peach	104	94ha	260	122	382	68%	0.9ha	2.50
- Sweet persimmon	286	471ha	784	386	1,170	67%	1.6ha	2,74
- Apple	181	869ha	655	308	963	68	4.8ha	3.62
- Pear	26	55ha	64	30	94	68	2.1ha	2.46
- Jujube	207	157ha	411	202	613	67	0.8ha	1.99
- Plum	37	74ha	66	31	97	68	2.0ha	1.78
- Citron	16	20ha	37	16	53	69	1.3ha	2.31
- Orchard facilities	57	95ha	211	103	314	67	1.7ha	3.70
Farm machinery								
- Speed sprayer	82	82ea	414	186	600	69	1.0ea	5.05
- Fruit sorter	31	1ea	2	1	3	67	1.0ea	2.00
- Power mower	5	5ea	5	2	7	71	1.0ea	1.00
Special crops								
- Oyster mushroom	546	15ha	1,308	644	1,952	67	0.03ha	2.40
- Oak mushroom	512	*4,005TL	1,887	1,156	3,043	62	7,822logs	3.69

Table 3
(2-2)

In million Won

subprojects	Loan made			(B) Farmers' contribution	(C=A+B) Total investment	Loan ratio (A/C)	Per farmer	
	Number	Quantity	Amount(A)				Quantity	Amount
- Omeeja fruit	42	16ha	97	52	149	65%	0.4ha	2.31
- Deodug root	171	28ha	232	119	351	66	0.2ha	1.36
- Ginseng	1,769	348ha	1,965	3,206	5,171	38	0.2ha	1.11
Beekeeping	307	5,194box	416	205	621	67	16.9box	1.36
Oil serice center	106	106 house	1,129	484	1,613	70	1.0house	10.65
Total	18,440	-	36,904	21,030	57,934	64		2.00

* TL : thousand logs

Project progress by subprojects and years

Table 4

In million Won

subprojects	1985			1986			1987			Total			Unit of quantity
	No.	Qt.	Amt.	No.	Qt.	Amt.	No.	Qt.	Amt	No.	Qt.	Amt.	
Greenhouse	4,649	494.9	8,744	3,560	583.9	4,406	4,832	551.8	10,695	13,041	1,630.6	23,845	ha
Upland irrigation													
- Vegetable	83	121.3	216	48	86.5	118	35	134.8	97	166	342.6	431	ha
- Orchard	53	95.7	221	67	115.2	264	84	154.1	332	204	365.0	817	ha
On-farm storage	52	2,107	242	109	2,400	515	87	2,430	539	248	6,937	1,296	pyong
Orchard development													
- Grapes	253	115.2	401	67	49.8	141	6	7.3	30	326	172.3	572	ha
- Peach	34	33.3	50	69	60.6	209	1	0.1	1	104	94.0	260	ha
- Sweet persimmon	98	115.7	202	43	75.4	160	145	280	422	286	471.1	784	ha
- Apple	11	12.3	31	40	58.1	112	130	298.6	512	181	369.0	655	ha
- Pear	-	-	-	15	11	15	11	44	49	26	55	64	ha
- Jujube	119	60.5	120	38	51.5	121	50	45.2	170	207	157.2	411	ha
- Plum	-	-	-	3	7	9	34	67	57	37	74	66	ha
- Citron	-	-	-	-		-	16	19.9	37	16	19.9	37	ha
- Orchard facilities	11	7	14	46	88	197	-	-	-	57	95	211	ha
Farm machinery													
- Speed sprayer	31	31	211	39	39	143	12	12	60	82	82	414	ea
- Fruit sorter	1	1	2	-	-	-	-	-	-	1	1	2	ea
- Power mower	-		-	3	3	3	2	2	2	5	5	5	ea
Special crops													
- Oyster mushroom	122	3.1	269	382	10.8	947	42	1.1	92	546	15.0	1,308	ha
- Oak mushroom	248	1,699	849	255	2,136	964	9	170	74	512	4,005	1,887	thou.logs
- Omeeja fruit	40	14.8	87	2	1.4	10	-	-	-	42	16.2	97	ha
- Deodug root	48	7.7	63	122	19.9	166	1	0.5	3	171	28.1	232	ha
- Ginseng	-		-	1,769	348.4	1,965	-		-	1,769	348.4	1,965	ha
Beekeeping	219	3,804	308	72	1,070	84	16	320	24	307	5,194	416	box (swarm)
Primary coops' oil service center	-		-	65	65	741	41	41	388	106	106	1,129	house
Total	6,072		12,030	6,914		11,290	5,554		13,584	18,440		36,904	

Status of loans made by subprojects and provinces

Table 5 (4 - 1)

(In million Won)

subprojects / province	Greenhouse			Upland irrigation (vegetable)			Upland irrigation (orchard)			On-farm storage			Grapes			Peach		
	No.	Qt.	Amt.	No.	Qt.	Amt.	No.	Qt.	Amt.	No.	Qt.	Amt.	No.	Qt.	Amt	No	Qt.	Amt
		ha			ha			ha			ha		ha				ha	
Kyong-gi	115	13.2	329				5	1.7	17	7	215	46	5	5.3	13	4	2.3	4
Kang-won	20	2.1	66				-	-	-	1	15	3	4	.5	14	2	2.4	2
Chung-buk	56	4.7	79				1	3	4	7	205	37	30	8.2	70	28	4.9	59
Chung-nam	825	117.1	1.756	2	2.8	4	1	11	20	49	2,614	316	157	59.3	186	9	9	87
Jeon-buk	871	130.9	2,155	1	0.5	1	3	6	13	10	360	53	26	23.0	67	26	45	68
Jeon-nam	2,320	282.4	4,800	157	331.8	415	2	7	12	8	151	17	75	45.3	167	12	12	14
Kyong-buk	6,299	663.2	7,633	6	7.5	11	191	335.8	742	103	2,317	508	16	17.2	24	23	18.4	26
Kyong-nam	2,097	312.2	5,003				1	3.5	10	2	73	15	12	8.0	29			
Jeju	400	95.5	1,780							61	1,440	301						
Busan city	25	5.4	176															
Taeku city	6	1.6	33															
Inchon city													1	0.3	2			
Kwangju city	7	2.3	35															
Total	13,041	16,306	23,845	166	342.6	431	204	365.0	817	248	6,937	1,296	326	172.3	572	104	94.0	26.0

Status of loans made by subprojects and provinces

Table 5 (4-2)

(In million Won)

subprojects / province	Sweet persimmon			Apple			Pear			Jujube			Plum			Citron		
	No.	Qt.	Amt.	No.	Qt.	Amt.	No.	Qt.	Amt.	No.	Qt.	Amt.	No.	Qt.	Amt	No	Qt.	Amt
		ha			ha			ha			ha			ha			ha	
Kyong-gi				4	9	20				2	3.8	14						
Kang-won				1	0.7	1												
Chung-buk				7	9.3	32				139	74.4	156						
Chung-nam				42	167.6	250	2	10	11	1	3	6						
Jeon-buk				8	20.7	37				26	32.9	54						
Jeon-nam	208	367.4	574							9	25.5	70	37	74	66	13	10.6	30
Kyong-buk	1	2.8	3	119	161.7	315				29	14.6	105						
Kyong-nam	77	100.9	207				24	45	53	1	3	7				3	9.3	7
Jeju																		
Busan city																		
Taeku city																		
Inchon city																		
Kwangju city																		
Total	286	471.1	784	181	869.0	655	26	55	64	207	157.2	411	37	74	66	16	19.9	37

Status of loans made by subprojects and provinces

Table 5 (4-3)

(In million Won)

subprojects	Orchard facilities			Speed sprayer			Fruit sorter			Power mower			Oyster mushroom			Oak mushroom		
province	No.	Qt.	Amt.	No.	Qt.	Amt.	No.	Qt.	Amt.	No.	Qt.	Amt.	No.	Qt.	Amt	No	Qt.	Amt
		ha			ea			ea			ea			ha			thou logs	
Kyong-gi				27	27	99							123	1.5	264	15	136	68
Kang-won				1	1	3							7	0.2	42			
Chung-buk	1	9	20	10	10	46				1	1	1	2	0.0	5	4	50	24
Chung-nam	30	45	90	27	27	154	1	1	2	2	2	3	41	1.2	111	133	1,182	538
Jeon-buk	5	5	8	1	1	3							51	2.2	154	165	931	456
Jeon-nam	21	36	94	7	7	51				1	1	1	306	9.2	694	73	352	180
Kyong-buk				8	8	55				1	1	1	2	0.1	9	35	520	196
Kyong-nam				1	1	3							10	0.4	20	81	711	366
Jeju																6	123	59
Busan city													3	0.2	4			
Taeku city													1	0.0	5			
Inchon city																		
Kwangju city																		
Total	57	95	211	82	82	414	1	1	2	5	5	5	546	15.0	1308	512	4005	1887

Status of loans made by subprojects and provinces

Table 5 (4-4)

(In million Won)

subprojects / province	Omeeja fruit			Deodug root			Ginseng			Beekeeping			Oil service center			Total		
	No.	Qt.	Amt.	No.	Qt.	Amt.	No.	Qt.	Amt.	No.	Qt.	Amt.	No.	Qt.	Amt	No	Qt.	Amt
		ha			ha			ha						house				
Kyong-gi	1	0.3	2	3	0.9	8							10	10	144	321		1030
Kang-won										17	340	24	5	5	61	58		215
Chung-buk				19	1.9	18	322	71	456	2	40	2	2	2	22	631		1031
Chung-nam	1	0.1	2				288	83	365	6	120	9	7	7	94	1624		4002
Jeon-buk	25	10.2	47	48	7.7	63	966	128.3	850	20	493	34	21	21	240	2273		4302
Jeon-nam				33	9.9	71				48	772	76	22	28	282	3358		7615
Kyong-buk	10	2.6	22	68	7.7	72	153	47.6	273	50	893	75	11	11	157	7125		10227
Kyong-nam							40	18.5	21	35	636	49	22	22	129	2486		5918
Jeju	5	3.0	23							129	1903	147				601		2309
Busan city																28		180
Taeku city																7		38
Inchon city																1		2
Kwangju city																7		35
Total	42	16.2	97	171	28.1	232	1769	348.4	1965	307	5194	416	106	106	1129	18440		36,904

Table 6

(2 - 1)

Relations of farm size to subloan size

Subprojects	Farm size (ha)	No.of subloan	Loan amount (Subloans in million Won)	Average size sub-loan(W'000)	% of subloan number	% of loan amount
Greenhouse	Less than0.5	2,738	5,723	2,090	21	24
	0.5 - 1	5,999	11,922	1,987	46	50
	1 - 2	3,782	5,723	1,513	29	24
	2 - 3	522	477	913	4	2
	over 3	-	-	-	-	-
	total	13,041	23,845	1,828	100	100
Upland irrigation	Less than0.5	-	-	-	-	-
	0.5 - 1	129	312	2,419	35	25
	1 - 2	178	537	3,017	48	43
	2 - 3	48	299	6,229	13	24
	over 3	15	100	6,667	4	8
	total	370	1,248	3,372	100	100
On-farm storage	Less than20pyong	67	220	3,283	27	17
	20 - 30	161	855	5,310	65	66
	30 - 40	20	221	11,050	8	17
	over 40	-	-	-	-	-
	total	248	1,296	5,225	100	100
Grape	Less than0.5	244	246	1,008	75	43
	0.5 - 1	42	149	3,548	13	26
	1 - 2	20	57	2,850	6	10
	2 - 3	20	120	6,000	6	21
	over 3	-	-	-	-	-
	total	326	572	1,755	100	100
Peach	Lee than0.5	62	81	1,306	60	31
	0.5 - 1	42	179	4,262	40	69
	1 - 2	-	-	-	-	-
	2 - 3	-	-	-	-	-
	over 3	-	-	-	-	-
	total	104	260	2,500	100	100
Sweet persimmon	Less than0.5	123	165	1,341	43	21
	0.5 - 1	143	384	2,685	50	49
	1 - 2	20	235	11,750	7	30
	2 - 3	-	-	-	-	-
	over 3	-	-	-	-	-
	total	286	784	2,741	100	100
Apple	Less than0.5	28	32	1,142	15	5
	0.5 - 1	85	262	3,082	47	40
	1 - 2	38	177	4,657	21	27
	2 - 3	18	118	6,555	10	18
	over 3	12	66	5,500	7	10
	total	181	655	3,618	100	100
Jujube	Less than0.5	128	107	836	62	26
	0.5 - 1	27	58	2,148	13	14
	1 - 2	52	246	4,731	25	60
	2 - 3	-	-	-	-	-
	over 3	-	-	-	-	-
	total	207	411	1,986	100	100

Relations of farm size to subloan size

Table 6
(2 - 2)

Subprojects	Farm size (ha)	No.of subloan	Loan amount (subloans in million Won)	Average size subloan(W'000)	% of subloan number	% of loan amount
Speed sprayer	Less than0.5	-	-	-	-	-
	0.5 - 1	-	-	-	-	-
	1 - 2	20	91	4,550	24	22
	2 - 3	43	132	3,069	53	32
	over 3	19	191	10,052	23	46
	total	82	414	5,048	100	100
Oyster mushroom	Less than0.5	251	654	2,606	46	50
	0.5 - 1	93	209	2,247	17	16
	1 - 2	87	183	2,103	16	14
	2 - 3	115	262	2,278	21	20
	over 3	-	-	-	-	-
	total	546	1,308	2,396	100	100
Oak mushroom	Less than0.5	123	378	3,073	24	20
	0.5 - 1	246	811	3,297	48	43
	1 - 2	123	623	5,065	24	33
	2 - 3	20	75	3,750	4	4
	over 3	-	-	-	-	-
	total	512	1,887	3,686	100	100
Deodug root	Less than0.5	10	9	900	6	4
	0.5 - 1	38	53	1,394	22	23
	1 - 2	94	135	1,436	55	58
	2 - 3	19	28	1,473	11	12
	over 3	10	7	700	6	3
	total	171	232	1,356	100	100
Ginseng	Lee than0.5	318	197	619	18	10
	0.5 - 1	566	432	763	32	22
	1 - 2	567	688	1,213	32	35
	2 - 3	195	491	2,517	11	25
	over 3	123	157	1,276	7	8
	total	1,769	1,965	1,110	100	100
Beekeeping	Less than0.5	37	47	1,270	12	11
	0.5 - 1	101	158	1,564	33	38
	1 - 2	135	166	1,230	44	40
	2 - 3	34	45	1,324	11	11
	over 3	-	-	-	-	-
	total	307	416	1,355	100	100
Others *	Less than0.5	70	403	5,757	24	25
	0.5 - 1	119	677	5,689	41	42
	1 - 2	81	403	4,975	28	25
	2 - 3	17	97	5,705	6	6
	over 3	3	31	10,333	1	2
	total	290	1,611	5,555	100	100
Grand total	Less than0.5	4,380	9,338	2,131	24	25
	0.5 - 1	7,630	15,606	2,045	41	42
	1 - 2	5,197	9,264	1,782	28	25
	2 - 3	1,051	2,144	2,039	6	6
	over 3	182	552	3,032	1	2
	total	18,440	36,904	2,001	100	100

* Others are subprojects which have 0.5% of total farmers or below such as pear, plum, citron, orchard facilities, fruit sorter, power mower, omeeja fruit and FC's oil service centers.

The number of subloans and their amount by subloan size were calculated by the average percentage of total subloan number and amount respectively.

The total of on-farm storage is included in less than 0.5 farm size category

Number of subloans and loans made by loan size

Table 7
(2 - 1)

in million Won

Subprojects	Loan size	Number of subloan	Loan amt. (subloans)	% of subloan number	% of subloan amount
Greenhouse	Less than 1	652	245	5	1
	1 - 2	5,217	6,325	40	26
	2 - 3	4,825	10,225	37	43
	over 3	2,347	7,050	18	30
	total	13,041	23,845	100	100
Upland irrigation	Less than 1	-	-	-	-
	1 - 2	-	-	-	-
	2 - 3	111	250	30	20
	over 3	259	998	70	80
	total	370	1,248	100	100
On-farm storage	Less than 1	-	-	-	-
	1 - 2	7	12	3	1
	2 - 3	33	93	13	7
	over 3	208	1,191	84	92
	total	248	1,296	100	100
Grapes	Less than 1	82	52	25	9
	1 - 2	130	155	40	27
	2 - 3	33	89	10	16
	over 3	81	276	25	48
	total	326	572	100	100
Peach	Less than 1	-	-	-	-
	1 - 2	52	78	50	30
	2 - 3	32	94	31	36
	over 3	20	88	19	34
	total	104	260	100	100
Sweet Persimmon	Less than 1	40	39	14	5
	1 - 2	163	287	57	37
	2 - 3	43	121	15	15
	over 3	40	337	14	43
	total	286	784	100	100
Apple	Less than 1	-	-	-	-
	1 - 2	14	26	8	4
	2 - 3	25	67	14	10
	over 3	142	562	78	86
	total	181	655	100	100
Jujube	Less than 1	95	92	46	23
	1 - 2	52	100	25	24
	2 - 3	44	124	21	30
	over 3	16	95	8	23
	total	207	411	100	100

Number of subloan and loans made by loan size

Table 7
(2 - 2)

In million Won

Subprojects	Loan size	Number of subloan	Loan amt. (subloans)	% of subloan number	% of subloan amount
Speed Sprayer	Less than 1	-	-	-	-
	1 - 2	-	-	-	-
	2 - 3	-	-	-	-
	over 3	82	414	100	100
	total	82	414	100	100
Oyster mushroom	Less than 1	44	39	8	3
	1 - 2	115	184	21	14
	2 - 3	229	523	42	40
	over 3	158	562	29	43
	total	546	1,308	100	100
Oak mushroom	Less than 1	-	-	-	-
	1 - 2	25	38	5	2
	2 - 3	128	283	25	15
	over 3	359	1,566	70	83
	total	512	1,887	100	100
Deodug root	Less than 1	60	32	35	14
	1 - 2	58	70	34	30
	2 - 3	37	77	22	33
	over 3	16	53	9	23
	total	171	232	100	100
Ginseng	Less than 1	642	177	36	9
	1 - 2	764	876	43	45
	2 - 3	271	631	16	32
	over 3	92	281	5	14
	total	1,769	1,965	100	100
Beekeeping	Less than 1	83	25	27	6
	1 - 2	224	391	73	94
	2 - 3	-	-	-	-
	over 3	-	-	-	-
	total	307	416	100	100
Others *	Less than 1	27	32	9	2
	1 - 2	109	387	38	24
	2 - 3	93	580	32	36
	over 3	61	612	21	38
	total	290	1,611	100	100
Grand total	Less than 1	1,725	733	9	2
	1 - 2	6,930	8,929	38	24
	2 - 3	5,904	13,157	32	36
	over 3	3,881	14,085	21	38
	total	18,440	36,904	100	100

* Others are subprojects which have 0.5% of total farmers or below such as pear, plum, citron, orchard facilities, fruit sorter, power mower, omeeja fruit and PC's oil service centers. The number of subloans and their amount by subloan size were calculated by the average percentage of total subloan number and amount respectively.

Wholesale market price of fruit

Table 8

(Per15kg)

Year	Apple (Fuji)		Pear (Singo)		Grape (Cambel Early)		Peach(Chang bang)		Orange		Sweet Persimmon	
	W	Price Index	W	Price Index	W	Price Index	W	Price Index	W	Price Index	W	Price Index
83	10,372	100	5,201	100	8,678	100	9,195	100	5,074	100	13,566	100
84	12,327	119	7,065	136	10,103	116	10,833	118	8,850	174	14,308	105
85	10,403	100	8,035	154	9,478	109	9,250	101	6,884	136	12,433	92
86	9,375	90	7,926	152	6,920	80	10,000	109	8,727	172	16,765	124
87	10,449	101	9,181	177	9,157	106	9,157	100	7,480	147	18,680	138

* 1 Medium grade prices of fruit on main wholesale markets in Seoul.

2. Averaged prices of prime harvest season by each fruit

- 0 Apple : Oct - Nov.
- 0 Pear : Oct - Nov.
- 0 Grape : Aug - Sep.
- 0 Peach : Jul - Aug
- 0 Orange : Nov - Dec.
- 0 Sweet Persimmon : Oct - Nov.

3 Source : NACF

Table 9

Wholesale Prices of Vegetables Produced in Greenhouses and Field [1]

(unit : Won/kg)

Year	Cucumber		Lettuce		Tomato		Oriental Melon		Green Pepper		Strawberry	
	G.H [2]	F [3]	G.H	F	G.H	F	G.H	F	G.H	F	G.H	F
1979	355.25	112.83	260.40	190.67	493.00	108.50	820.33	132.00	1,573.60	320.67	1,124,00	439.50
1980	401.75	182.33	412.00	170.83	784.75	180.00	807.66	194.50	1,710.25	284.00	1,771.00	698.50
1981	454.50	263.33	406.80	296.16	595.25	157.00	907.66	298.50	2,013. 6	236.75	1,651.00	836.00
1982	439.00	197.17	260.80	261.17	609.20	88.00	858.75	208.50	2.036.40	245.33	1,825.00	602.50
1983	611.00	205.33	335.80	334.66	644.40	163.00	920.67	176.50	1,811.20	206.33	1,761.00	822.50
1984	447.50	164.50	429.50	380.67	606.50	159.00	880.00	238.50	2,059.20	428.66	1,502.00	876.00
1985	565.75	193.83	297.75	445.33	651.20	144.67	720.00	210.50	1,631.40	393.67	1,522.25	642.00
1986	495.75	168.83	378.25	389.67	625.40	193.00	685.25	239.67	1,168.80	291.67	1,153.00	417.00
1987	608.25	312.33	351.75	421.17	627.00	586.00	899.50	304.67	1,696.40	608.67	1,491,75	778.00

Note) 1/ The average monthly auction prices of Seoul vegetable markets on the basis of medium graded vegetables.

2/ Greenhouse

3/ Field

Source : NACF

Table 10

Apple price by Month

(unit : Won/15kg)

Variety	Year	Price by Month								Index by Month						
		Oct	Nov	Dec	Next Jan	Feb	Mar	Apr	May	harvest	1 Month later	2 Months later	3 Months later	4 Months later	5 Months later	6 Months later
Fuji	1983		9,550	9,232	10,036	11,931	12,306	11,267	9,387	100	98	105	125	129	118	98
	1984		12,250	12,129	12,417	12,387	14,000	18,560	17,193	100	99	101	101	114	151	140
	1985		10,077	13,000	12,938	10,318	10,000	9,460	9,300	100	129	128	102	99	94	92
	1986		8,500	9,731	10,391	12,625	16,640	19,515	19,480	100	114	122	149	196	230	229
	1987		8,660	9,120	11,104	15,043	16,200	13,896	15,750	100	105	128	174	187	160	182
										100	109	117	130	145	151	148
Rall's Janet	1983			2,725	3,179	4,276	4,529	4,367	3,483	100	117	157	166	160	128	
	1984			5,467	5,563	5,864	6,500	8,720	8,625	100	102	107	119	160	158	
	1985			4,308	4,000	4,000	4,333	3,640	3,500	100	93	93	101	84	81	
	1986			4,000	4,000	4,125	6,712	9,731	8,000	100	100	103	168	243	200	
	1987									100	103	115	139	162	142	
Indo	1983			3,400	3,196	4,500	4,596	4,400	3,096	100	140	143	138	97		
	1984				5,833	6,182	6,780	9,480	9,625	100	106	116	163	165		
	1985			5,000	5,521	6,114	5,563	4,260	3,778	100	110	100	77	68		
	1986			5,981	6,848	7,000				100	102					
	1987				5,700	5,500	6,680	6,462		100	96	117	113			
										100	111	119	123	110		
Jonathan	1983	3,903	4,733	4,177	3,679	4,000				100	121	107	94	102		
	1984	5,432	8,283	6,967	9,167					100	152	128	169			
	1985	6,042	5,327	5,280	5,396	5,609	5,875	4,080	4,000	100	88	87	89	93	97	68
	1986	5,750	5,580	5,962	6,000	6,182				100	97	104	104	108		
	1987	5,952	5,500	4,000	4,729	5,826	5,500			100	92	67	79	98	92	
										100	110	99	107	100	95	

* Source :NACF

Vegetables Produced in Greenhouses

Table 11

(Unit : ha, Thousand M/T)

Year	Cultivated Area	Utilized Area	Production
1970	762	1,289	48
1971	1,014	1,692	59
1972	976	1,607	44
1973	1,743	2,544	65
1974	1,746	3,503	85
1975	1,746	3,341	76
1976	1,796	3,275	81
1977	2,555	3,981	89
1978	3,738	4,971	116
1979	4,736	6,348	174
1980	7,142	9,228	217
1981	9,315	10,936	252
1982	10,641	12,109	272
1983	11,718	13,960	326
1984	12,992	15,600	376
1985	16,569	18,835	460
1986	18,822	21,061	500
1987	20,471	22,339	549

Fruit Production by Year

Table 12

(unit : thousand ha/thousand Ton)

Year	Apple		Pear		Persimmon		Grape		Peach		Orange	
	Planted Area	Production	Planted Area	Production	Planted Area	Production	Planted Area	Production	Planted Area	Production	Planted Area	Production
83	41	586	10	106	7	43	14	131	11	99	15	331
84	39	528	9	101	8	55	16	125	12	98	15	261
85	38	533	9	128	8	64	16	150	13	132	16	371
86	36	538	9	135	9	65	17	165	14	139	17	340
87	39	589	8	126	9	65	17	158	14	138	18	441

* Source : NACF

Financial and economic analyses of subprojects

Summary of analysis

Financial rates of return of the subprojects (3-1) (FRR and ERR) In thou. Won

Subprojects	Scale&type of farm	Year	Initial investment	FRR before financing	financed amount	ERR before financing	Financing terms
Greenhouse A. Single cropping pattern	0 Floor space : 10a (990㎡) 0 style : Arch type, single span 0 Materials : Iron frame 0 Construction style : - Movable system in single cropping pattern. -Fixed system in double cropping pattern.						Grace period (GP) : 1yr Repayment period (RP) : 5yrs
cucumber	Forcing cultivation	15	5,587	39%	3,200	33%	
	Semi forcing cultivation	"	4,500	14%	2,500	12%	
Green pepper	Forcing cultivation	"	6,147	over50%	3,600	50%	
	Rateral cultivation	"	4,449	"	2,400	"	
Tomato	Forcing cultivation	"	5,425	48%	3,000	42%	
	Semi forcing cultivation	"	4,525	29%	2,500	26%	
Strawberry	Forcing cultivation	"	5,856	29%	3,500	22%	
	Semi forcing cultivation	"	5,061	17%	3,000	13%	
Pumpkin	Forcing cultivation	"	4,905	9%	2,800	6%	
	Semi forcing cultivation	"	4,140	15%	2,300	13%	
Oriental melon	Semi forcing cultivation	"	4,141	50%	2,300	50%	
	Premature cultivation	"	4,141	12%	2,300	10%	
Watermelon	Semi forcing cultivation	"	4,434	50%	2,500	over50%	
	Premature cultivation	"	4,434	50%	2,500	"	
Chrysanthemum	Light culture		12,819	39%	7,800	34%	
B. Double cropping pattern							
cucumber-Green pepper	Rateral cultivation / Forcing cultivation	15	7,699	over50%	2,700	over50%	
Oriental melon-Watermelon	Semi forcing cultivation / Forcing cultivation	"	6,481	over50%	2,500	"	
cucumber-Oriental melon	Rateral cultivation / semi forcing cultivation	"	6,046	over50%	2,700	"	
Pumpkin-Green pepper	Rateral cultivation / semi forcing cultivation	"	5,994	25%	2,500	31%	
Letluce-cucumber	semi forcing cultivation /	"	5,793	16%	2,400	21%	
cucumber-cucumber	forcing cultivation / Rateral cultivation	"	7,139	over50%	3,300	over50%	
Chrysanthemum-Tomato	Light cultivation / semi forcing cultivation	"	14,154	over50%	7,600	over50%	

Summary of analysis (FRR) (3-2) (ERR) In thou. Won

subproject	scale&type of farm	Year	Initial investment	FRR before financing	financed amount	ERR before financing	financing terms
Movable sprinkler for vegetable	Irrigation for 1ha vegetable field	10	3,844	over50%	1,900	over50%	GP : 3yrs RP : 4yrs
Fixed sprinkler for apple orchard	Irrigation for 1ha apple orchard	15	4,765	over50%	2,900	over50%	GP : 5yrs RP : 5yrs
Ginseng	0 Planting area:10a 0 Cropping pattern: nursery root settling in 2nd period year 0 Iron framed house: 50pyong	4	1,854	26%	870	26%	GP : 2yrs RP : 1yr, to be repayed once after 3yrs.
oyster mushroom	0 Growing bed:70pyong 0 Produce twice a year in a fermented straw.	7	7,513	24%	4,400	22%	GP : 1yr RP : 5yrs
Oak mushroom	0 Number of logsused : 5,000logs 0 Time of spawn innoculation:Mar-May 0 Producing period: 6yrs	6	4,685	30%	3,200	28%	GP : 2yrs RP : 3yrs
Deodug root	0 planting area:10a 0 Root planting in the Spring	3	1,377	23%	900	20%	GP : 1yr RP : 2yrs
Omeeja root	0 Planting area:1 ha 0 Planting on existing upland 0 In yeat 6-7, new sprouts are induced by cutting old stems	7	8,249	21%	4,600	22%	GP : 2yrs RP : 3yrs
Kookija fruit	0 Planting area:1ha 0 Plant on existing upland	7	8,857	41%	4,800	34%	GP : 2yrs RP : 3yrs
Beekeeping	0 Number of honey-bee swarms:10srs 0 Utilize the unused labor in the farm household	10	1,465	34%	1,000	34%	GP : 2yrs RP : 3yrs

Summary of analysis (3-3)

(FRR and ERR)

In t .. Won

subproject	Scale&type of farm	year	Initial inveatment	FRR before Financing	financed amount	ERR before financing	financing terms
Apple Orchard	0 Orchard area : 1ha 0 Variety:Dwarf stock; Fuji 0 Reclaimed form: riverside land	20	6,931	38%	4,100	39%	GP : 5yrs RP : 4yrs
Pear Orchard	0 Orchard area : 1ha 0 Variety : singo 0 Reclaimed form: slope land reclamation	"	4,541	19%	2,500	20%	GP : 6yrs RP : 4yrs
Peach Orchard	0 O : 1ha 0 V : Baikdo 0 R : slope land reclamation	"	4,510	30%	2,400	30%	Gp : 5yrs Rp : 4yrs
Grape Orchard	0 O : 1ha 0 V : campbell Early 0 R : slope land reclamation	"	7,060	18%	4,300	18%	GP : 4yrs RP : 4yrs
Sweet persimmon Orchard	0 O : 1ha 0 V : Buyou 0 R : slope land reclamation	"	4,530	26%	2,500	26%	GP : 6yrs Rp : 4yrs
plum Orchard	0 O : 1ha 0 V : Baikgaha 0 R : slope land reclamation	"	4,071	38%	2,200	38%	GP : 5yrs RP : 4yrs
Jujube Orchard	0 O : 1ha 0 V : Mudeung 0 R : slope land reclamation	"	4,991	37%	2,900	36%	GP : 5yrs RP : 4yrs
On-farm fruit storehouse	0 Floor area : 20pyong 0 stored fruit : Apple	"	8,651	18%	5,200	17%	GP : 1yr RP : 6yrs
speed sprayer (s.s)	0Farm chemical spraying for 5ha apple orchard 0 Capacity of speed sprayer : -Engine capacity:32HP -Discharg Volume : 84 ℓ/m	7	9,205	22%	8,400	14%	GP : 0yr RP : 7yrs
Power mower	0 Mowing out weeds on 3ha orchard 0 Engine capacity : 6.5HP	3	1,048	29%	990	17%	GP : 0yr RP : 3yrs

Financial and economic analyses of geenhouse projects

1-1. Financial analysis of greenhouse Project

Crop : Cucumber (Foricng culture)
Area : 10a

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales	3,588	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	3,588	→	→	→	→	→	→	→	→	3,611
Cost										
0 Investment/Replacement costs										
- Iron frame	1,920									
- P.E. film	277									
- Heat insulation covers	306									
- Heating facility	336					336		336		
- Electric heatbed	149					149		149		
- Sprayer	227							227		
Sub-total	3,215					485		712		
0 Operating costs										
- Management costs	2,080	2,459	→	→	→	→	→	→	→	→
- Small tools	10	→	→	→	→	→	→	→	→	→
- Repairs/Maintenance	132	→	→	→	→	→	→	→	→	→
Sub-total	2,222	2,601	→	→	→	→	→	→	→	→
0 Opportunity cost	150	→	→	→	→	→	→	→	→	→
Total	5,587	2,751	→	→	→	3,236	2,751	3,463	2,751	→
*Cash flow before financing	(1,999)	837	→	→	→	352	837	125	837	960
Financing										
0 Loan receipt	3,200									
0 Loan repayment										
- Principal		640	→	→	→	→				
- Interest	256	256	205	154	102	51				
*Cash flow after financing	945	(59)	(8)	43	95	(339)	837	125	834	860

* FRR before financing : 39%

* ERR : 33%

1-2. Financial analysis of greenhouse Project

Crop : Cucumber (Semi-forcing culture) In thou. Won
Area : 10a

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales	2,378	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	2,378	→	→	→	→	→	→	→	→	2,401
Cost										
0 Investment/Replacement costs										
-Iron frame	1,920									
-P.E. film	277									
-Heat insulation covers	306									
-Electric heatbed	149					149		149		
-Sprayer	227							227		
Sub-total	2,879					149		376		
0 Operating costs										
-Management costs	1,346	1,725	→	→	→	→	→	→	→	→
-Small tools	10	→	→	→	→	→	→	→	→	→
-Repairs/Maintenance	115	→	→	→	→	→	→	→	→	→
Sub-total	1,471	1,850	→	→	→	→	→	→	→	→
0 Opportunity cost	150	→	→	→	→	→	→	→	→	→
Total	4,500	2,000	→	→	→	2,149	2,000	2,376	2,000	→
*Cash flow before financing	(2,122)	378	→	→	→	229	378	2	378	401
Financing										
0 Loan receipt	2,500									
0 Loan repayment										
-Principal		500	→	→	→	→				
-Interest	200	200	160	120	80	40				
*Cash flow after financing	178	(322)	(282)	(242)	(202)	(311)	378	2	378	401

* FRR before financing : 14%

* ERR : 12%

2-1. Financial analysis of greenhouse Project

Crop : Green Pepper (Forcing culture) — In thou. Won
Area : 10a

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales	6,216	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	6,216	→	→	→	→	→	→	→	→	6.239
Cost										
0 Investment/Replacement costs	1,920									
-Iron frame	227									
-P.E. film	306									
-Heat insulation covers	336					336		336		
-Electric heatbed	149					149		149		
-Sprayer	227							227		
Sub-total	3,215					485		712		
0 Operating costs										
-Management costs	2,640	3,019	→	→	→	→	→	→	→	→
-Small tools	10	→	→	→	→	→	→	→	→	→
-Repairs/Maintenance	132	→	→	→	→	→	→	→	→	→
Sub-total	2,782	3,161	→	→	→	→	→	→	→	→
0 Opportunity cost	150	→	→	→	→	→	→	→	→	→
Total	6,147	3,311	→	→	→	3,796	3,311	4,023	3,311	→
*Cash flow before financing	69	2,905	→	→	→	2,420	2,905	2,193	2,905	2,928
Financing										
0 Loan receipt	3,600									
0 Loan repayment										
-Principal		720	→	→	→	→				
-Interest	288	288	230	173	115	58				
*Cash flow after financing	3,381	1,897	1,955	2,012	2,070	1,642	2,905	2,193	2,905	2,928

* FRR before financing : over 50%

ERR : 50%

2-2. Financial analysis of greenhouse Project

Crop : Green Pepper (control culture)
Area : 10a

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales	4,722	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	4,722	→	→	→	→	→	→	→	→	4,745
Cost										
0 Investment/Replacement costs										
-Iron frame	1,920									
-P.E. film	277									
-Heat insulation covers	306									
-Electric heatbed	149					149		149		
-Sprayer	227							227		
Sub-total	2,879					149		376		
0 Operating costs										
-Management costs	1,295	1,674	→	→	→	→	→	→	→	→
-Small tools	10	→	→	→	→	→	→	→	→	→
-Repairs/Maintenance	115	→	→	→	→	→	→	→	→	→
Sub-total	1,420	1,799	→	→	→	→	→	→	→	→
0 Opportunity cost	150	→	→	→	→	→	→	→	→	→
Total	4,449	1,949	→	→	→	2,098	1,949	2,325	1,949	→
*Cash flow before financing	273	2,773	→	→	→	2,624	2,773	2,397	2,773	2,796
Financing										
0 Loan receipt	2,400									
0 Loan repayment										
-Principal		480	→	→	→	→				
-Interest	192	192	154	115	77	38				
*Cash flow after financing	5,360	2,101	2,139	2,178	2,216	2,106	2,773	2,397	2,773	2,796

* FRR before financing : over 50%
* ERR : 50%

3-1. Financial analysis of greenhouse Project

Crop : Tomato (Forcing culture)
Area : 10a

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales	3,536	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	3,536	→	→	→	→	→	→	→	→	3,559
Cost										
0 Investment/Replacement costs										
- Iron frame	1,920									
- P.E. film	277									
- Heat insulation covers	306									
- Heating facility	336					336		336		
- Electric heatbed	149					149		149		
- Sprayer	227							227		
Sub-total	3,215					485		712		
0 Operating costs										
- Management costs	1,918	2,297	→	→	→	→	→	→	→	→
- Small tools	10	→	→	→	→	→	→	→	→	→
- Repairs/Maintenance	132	→	→	→	→	→	→	→	→	→
Sub-total	2,060	2,439	→	→	→	→	→	→	→	→
0 Opportunity cost	150	→	→	→	→	→	→	→	→	→
Total	5,425	2,589	→	→	→	3,074	2,589	3,301	2,589	→
*Cash flow before financing	(1,889)	947	→	→	→	462	947	235	947	970
Financing										
0 Loan receipt	3,100									
0 Loan repayment										
- Principal		620	→	→	→	→				
- Interest	248	248	198	149	99	50				
*Cash flow after financing	963	79	129	178	228	(208)	947	235	947	970

* FRR before financing : 48%

* ERR : 42%

3-2. Financial analysis of greenhouse Project

Crop : Tomato (Semi-forcing culture)
Area : 10a

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales	2,602	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	2,602	→	→	→	→	→	→	→	→	2,625
Cost										
0 Investment/Replacement costs										
-Iron frame	1,920									
-P.E. film	277									
-Heat insulation covers	306									
-Electric heatbed	149					149		149		
-Sprayer	227							227		
Sub-total	2,879					149		376		
0 Operating costs										
-Management costs	1,371	1,750	→	→	→	→	→	→	→	→
-Small tools	10	→	→	→	→	→	→	→	→	→
-Repairs/Maintenance	115	→	→	→	→	→	→	→	→	→
Sub-total	1,496	1,875	→	→	→	→	→	→	→	→
0 Opportunity cost	150	→	→	→	→	→	→	→	→	→
Total	4,525	2,205	→	→	→	2,174	2,025	2,401	2,025	→
*Cash flow before financing	(1,923)	577	→	→	→	428	577	201	577	600
Financing										
0 Loan receipt	2,500									
0 Loan repayment										
-Principal		500	→	→	→	→				
-Interest	200	200	160	120	80	40				
*Cash flow after financing	377	(123	(83)	(43)	(3)	(112)	577	201	577	600

* FRR before financing : 29%
* ERR : 26%

4-1. Financial analysis of greenhouse Project

Crop : Strawberry (Forcing culture) — In thou. Won
Area : 10a

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales	3,820	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	3,820	→	→	→	→	→	→	→	→	3,843
Cost										
0 Investment/Replacement costs										
-Iron frame	1,920									
-P.E. film	277									
-Heat insulation covers	306									
-Electric heatbed	336					336		336		
-Sprayer	227							227		
Sub-total	3,066					336		563		
0 Operating costs										
-Management costs	2,506	2,885	→	→	→	→	→	→	→	→
-Small tools	10	→	→	→	→	→	→	→	→	→
-Repairs/Maintenance	124	→	→	→	→	→	→	→	→	→
Sub-total	2,640	3,019	→	→	→	→	→	→	→	→
0 Opportunity cost	150	→	→	→	→	→	→	→	→	→
Total	5,856	3,169	→	→	→	3,505	3,169	3,732	3,169	→
*Cash flow before financing	(2,306)	651	→	→	→	315	651	88	651	674
Financing										
0 Loan receipt	3,500									
0 Loan repayment										
-Principal		700	→	→	→	→				
-Interest	280	280	224	168	112	56				
*Cash flow after financing	1,184	(329)	(273)	(217)	(161)	441	651	88	651	674

* FRR before financing : 29%
* ERR : 22%

4-2. Financial analysis of greenhouse Project

Crop : Strawberry (Semi-forcing culture)
Area : 10a

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales	3,901	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	3,091	→	→	→	→	→	→	→	→	3,114
Cost										
0 Investment/Replacement costs										
- Iron frame	1,920									
- P.E. film	277									
- Heat insulation covers	306									
- Sprayer	227							227		
Sub-total	2,730							227		
0 Operating costs										
- Management costs	2,056	2,435	→	→	→	→	→	→	→	→
- Small tools	10	→	→	→	→	→	→	→	→	→
- Repairs/Maintenance	115	→	→	→	→	→	→	→	→	→
Sub-total	2,181	2,560	→	→	→	→	→	→	→	→
0 Opportunity cost	150	→	→	→	→	→	→	→	→	→
Total	5,061	2,710	→	→	→	→	→	2,937	2,710	→
*Cash flow before financing	(1,970)	381	→	→	→	→	→	154	381	404
Financing										
0 Loan receipt										
0 Loan repayment	3,000									
- Principal		600	→	→	→	→				
- Interest	240	240	192	144	96	48				
*Cash flow after financing	790	(459)	(411)	(363)	(315)	(267)	381	154	381	404

* FRR before financing : 17%

* ERR : 13%

5-1. Financial analysis of greenhouse Project

Crop : Pumpkin (Forcing Culture)
Area : 10a

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales	2,460	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	2,460	→	→	→	→	→	→	→	→	2,483
Cost										
0 Investment/Replacement costs										
- Iron frame	1,920									
- P.E. film	227									
- Heat insulation covers	306									
- Heating facility	336					336		336		
- Electric heatbed	149					149		149		
- Sprayer	227							227		
Sub-total	3,215					485		712		
0 Operating costs										
- Management costs	1,398	1,777	→	→	→	→	→	→	→	→
- Small tools	10	→	→	→	→	→	→	→	→	→
- Repairs/Maintenance	132	→	→	→	→	→	→	→	→	→
Sub-total	1,540	1,919	→	→	→	→	→	→	→	→
0 Opportunity cost	150	→	→	→	→	→	→	→	→	→
Total	4,905	2,069	→	→	→	2,554	2,069	2,781	2,069	→
*Cash flow before financing	(2,445)	391	→	→	→	(94)	391	(321)	391	414
Financing										
0 Loan receipt	2,800									
0 Loan repayment										
- Principal		560	→	→	→	→				
- Interest	224	224	179	134	90	45				
*Cash flow after financing	131	(393)	(348)	(303)	(259)	(699)	391	(321)	391	414

* FRR before financing : 9%
* ERR : 6%

5-2. Financial analysis of greenhouse Project

Crop : Pumpkin (Semi-forcing culture) — In thou. Won
Area : 10a

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales	2,031	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	2,031	→	→	→	→	→	→	→	→	2,054
Cost										
0 Investment/Replacement costs										
-Iron frame	1,920									
-P.E. film	277									
-Heat insulation covers	306									
-Electric heatbed	149					149		149		
-Sprayer	227							227		
Sub-total	2,879					149		376		
0 Operating costs										
-Management costs	986	1,365	→	→	→	→	→	→	→	→
-Small tools	10	→	→	→	→	→	→	→	→	→
-Repairs/Maintenance	115	→	→	→	→	→	→	→	→	→
Sub-total	1,111	1,490	→	→	→	→	→	→	→	→
0 Opportunity cost	150	→	→	→	→	→	→	→	→	→
Total	4,140	1,640	→	→	→	1,789	1,640	2,016	1,640	→
*Cash flow before financing	(2,109)	391	→	→	→	242	391	15	391	414
Financing										
0 Loan receipt	2,300									
0 Loan repayment										
-Principal		460	→	→	→	→				
-Interest	184	184	147	110	74	37				
*Cash flow after financing	7	(253)	(216)	(170)	(143)	(225)	391	15	391	414

* FRR before financing : 15%
* ERR : 13%

6-1. Financial analysis of greenhouse Project

Crop : Oriental Melon (Semi-forcing culture) — In thou. Won

Area : 10a

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales	2,789	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	2,798	→	→	→	→	→	→	→	→	2,821
Cost										
0 Investment/Replacement costs										
-Iron frame	1,920									
-P.E. film	277									
-Heat insulation covers	306									
-Electric heatbed	149					149		149		
-Sprayer	227							227		
Sub-total	2,879					149		376		
0 Operating costs										
-Management costs	987	1,366	→	→	→	→	→	→	→	→
-Small tools	10	→	→	→	→	→	→	→	→	→
-Repairs/Maintenance	115	→	→	→	→	→	→	→	→	→
Sub-total	1,112	1,491	→	→	→	→	→	→	→	→
0 Opportunity cost	150	→	→	→	→	→	→	→	→	→
Total	4,141	1,641	→	→	→	1,790	1,641	2,017	1,641	→
*Cash flow before financing	(1,343)	1,157	→	→	→	1,008	1,157	781	1,157	1,180
Financing										
0 Loan receipt	2,300									
0 Loan repayment										
-Principal		460	→	→	→	→				
-Interest	184	184	147	110	74	37				
*Cash flow after financing	773	513	550	587	623	660	1,157	781	1,157	1,180

* FRR before financing : over 50%

* ERR : 50%

6-2. Financial analysis of greenhouse Project

Crop : Oriental Melon (Pre-mature culture)
Area : 10a

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales	1,985	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	1,985	→	→	→	→	→	→	→	→	2,008
Cost										
0 Investment/Replacement costs										
-Iron frame	1,920									
-P.E. film	277									
-Heat insulation covers	306									
-Electric heatbed	149					149		149		
-Sprayer	227							227		
Sub-total	2,879					149		376		
0 Operating costs										
-Management costs	987	1,366	→	→	→	→	→	→	→	→
-Small tools	10	→	→	→	→	→	→	→	→	→
-Repairs/Maintenance	116	→	→	→	→	→	→	→	→	→
Sub-total	1,112	1,491	→	→	→	→	→	→	→	→
0 Opportunity cost	150	→	→	→	→	→	→	→	→	→
Total	4,141	1,641	→	→	→	1,790	1,641	2,017	1,641	→
*Cash flow before financing	(2,156)	344	→	→	→	195	344	(32)	344	367
Financing										
0 Loan receipt	2,300									
0 Loan repayment										
-Principal		460	→	→	→	→				
-Interest	184	184	147	110	74	37				
*Cash flow after financing	(40)	(300)	(263)	(226)	(190)	(302)	344	(32)	344	367

* FRR before financing : 12%
* ERR : 10%

7-1. Financial analysis of greenhouse Project

Crop : Watermelon (Semi-foring culture)
Area : 10a

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales	4,750	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	4,750	→	→	→	→	→	→	→	→	4,773
Cost										
0 Investment/Replacement costs										
-Iron frame	1,920									
-P.E. film	277									
-Heat insulation covers	306									
-Electric heatbed	149					149		149		
-Sprayer	227							227		
Sub-total	2,879					149		376		
0 Operating costs										
-Management costs	1,280	1,659	→	→	→	→	→	→	→	→
-Small tools	10	→	→	→	→	→	→	→	→	→
-Repairs/Maintenance	115	→	→	→	→	→	→	→	→	→
Sub-total	1,405	1,784	→	→	→	→	→	→	→	→
0 Opportunity cost	150	→	→	→	→	→	→	→	→	→
Total	4,434	1,934	→	→	→	2,083	1,934	2,310	1,934	→
*Cash flow before financing	316	2,816	→	→	→	2,667	2,816	2,440	2,816	2,839
Financing										
0 Loan receipt	2,500									
0 Loan repayment										
-Principal		500	→	→	→	→				
-Interest	200	200	160	120	80	40				
*Cash flow after financing	2,616	2,116	2,156	2,196	2,236	2,127	2,816	2,440	2,816	2,839

* FRR before financing : over 50%
* ERR : 50%

7-2. Financial analysis of greenhouse Project

Crop : Water melon (Pre-mature culture)
Area : 10a

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales	3,420	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	3,420	→	→	→	→	→	→	→	→	3,443
Cost										
0 Investment/Replacement costs										
-Iron frame	1,920									
-P.E. film	277									
-Heat insulation covers	306									
-Electric heatbed	149					149		149		
-Sprayer	227							227		
Sub-total	2,879					149		376		
0 Operating costs										
-Management costs	1,280	1,659	→	→	→	→	→	→	→	→
-Small tools	10	→	→	→	→	→	→	→	→	→
-Repairs/Maintenance	115	→	→	→	→	→	→	→	→	→
Sub-total	1,405	1,784	→	→	→	→	→	→	→	→
0 Opportunity cost	150	→	→	→	→	→	→	→	→	→
Total	4,434	1,934	→	→	→	2,083	1,934	2,310	1,934	→
*Cash flow before financing	(1,014)	1,486	→	→	→	1,337	1,486	1,110	1,486	1,509
Financing										
0 Loan receipt	2,500									
0 Loan repayment										
-Principal		500	→	→	→	→				
-Interest	200	200	160	120	80	60				
*Cash flow after financing	1,286	786	826	866	906	926	1,486	1,110	1,486	1,509

* FRR before financing : over 50%

* ERR : 50%

8. Financial analysis of greenhouse Project

Crop : Chrysanthemum (Light culture)
Area : 10a

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales	7,989	→	→	→	→	→	→	→	→	→
0 Residual value										416
Total	7,989	→	→	→	→	→	→	→	→	8,405
Cost										
0 Investment/Replacement costs										
-Iron frame	1,833									
-P.E. film	192									
-Heat insulation covers	1,027									
-Irrigation facility	241					48		241		
-Heating facility	3,150							3,150		
-Ventilating facility	540							540		
-Sprayer	227							227		
Sub-total	7,210					48		4,158		
0 Operating costs										
-Management costs	5,139	5,536	→	→	→	→	→	→	→	→
-Small tools	20	→	→	→	→	→	→	→	→	→
-Repairs/Maintenance	300	→	→	→	→	→	→	→	→	→
Sub-total	5,459	5,856	→	→	→	→	→	→	→	→
0 Opportunity cost	150	→	→	→	→	→	→	→	→	→
Total	12,819	6,006	→	→	→	6,054	6,006	10,164	6,006	→
*Cash flow befor financing	(4,830)	1,983	→	→	→	1,935	1,983	(2,175)	1,983	2,399
Financing										
0 Loan receipt	7,800									
0 Loan repayment										
-Principal		1,560	→	→	→	→				
-Interest	624	624	499	374	250	125				
*Cash flow after financing	2,346	9201)	(76)	49	173	25	1,983	(2,175)	1,983	2,399

*FRR before financing : over 39%

*ERR : 34%

9. Financial analysis of greenhouse Project

Crop : Cucumber- Green Pepper
Area : 10a

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales										
- 1st crop : Cucumber	1,860	→	→	→	→	→	→	→	→	→
- 2nd crop : Green pepper	6,216	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	8,076	→	→	→	→	→	→	→	→	8,099
Cost										
0 Investment/Replacement costs										
- Iron frame	1,920									
- P.E. film	333									
- Heat insulation covers	306									
- Heating facility	336					336		336		
- Electric heatbed	149					149		149		
- Sprayer	227							227		
Sub-total	3,271					485		712		
0 Operating costs										
- Management costs	3,966	4,744	→	→	→	→	→	→	→	→
* Cucumber	1,346	1,725	→	→	→	→	→	→	→	→
* Green pepper	2,640	3,019	→	→	→	→	→	→	→	→
- Small tools	10	→	→	→	→	→	→	→	→	→
- Repairs/Maintenance	132	→	→	→	→	→	→	→	→	→
Sub-total	4,128	4,886	→	→	→	→	→	→	→	→
0 Opportunity cost	300	→	→	→	→	→	→	→	→	→
Total	7,699	5,186	→	→	→	5,671	5,186	5,898	5,186	→
*Cash flow before financing	377	2,890	→	→	→	2,405	2,890	2,178	2,890	2,913
Financing										
0 Loan receipt	2,700									
0 Loan repayment										
- Principal		540	→	→	→	→				
- Interest	216	216	173	130	86	43				
*Cash flow after financing	2,861	2,134	2,177	2,220	2,264	2,307	2,890	2,178	2,890	2,913

* FRR before financing : over 50%
* ERR : 50%

10. Financial analysis of greenhouse Project

. Crop : Oriental Melon-Watermelon
Area : 10a

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales										
- 1st crop : Oriental Melon	2,090	→	→	→	→	→	→	→	→	→
- 2nd crop : Watermelon	5,678	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	7,768	→	→	→	→	→	→	→	→	7,791
Cost										
0 Investment/Replacement costs										
- Iron frame	1,920									
- P.E. film	333									
- Heat insulation covers	306									
- Heating facility	336					336		336		
- Electric heatbed	149					149		149		
- Sprayer	227							227		
Sub-total	3,271					485		712		
0. Operating costs										
- Management costs	2,768	3,526	→	→	→	→	→	→	→	→
* Oriental Melon	987	1,366	→	→	→	→	→	→	→	→
* Watermelon	1,781	2,160	→	→	→	→	→	→	→	→
- Small tools	10	→	→	→	→	→	→	→	→	→
- Repairs/Maintenance	132	→	→	→	→	→	→	→	→	→
Sub-total	2,910	3,668	→	→	→	→	→	→	→	→
0 Opportunity cost	300	→	→	→	→	→	→	→	→	→
Total	6,481	3,968	→	→	→	4,453	3,968	4,680	3,968	→
*Cash flow before financing	1,287	3,800	→	→	→	3,315	3,800	3,080	3,800	3,823
Financing										
0 Loan receipt	2,500									
0 Loan repayment										
- Principal		500	→	→	→	→				
- Interest	200	200	160	120	80	40				
*Cash flow after financing	3,587	3,100	3,140	3,180	3,220	3,260	3,800	3,080	3,800	3,823

* FRR before financing : over 50%
* ERR : 50%

11. Financial analysis of greenhouse Project

Crop : Cucumber-Oriental melon
Area : 10a

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales										
- 1st crop : Cucumber	3,515	→	→	→	→	→	→	→	→	→
- 2nd crop : Oriental melon	2,730	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	6,245	→	→	→	→	→	→	→	→	6,268
Cost										
0 Investment/Replacement costs										
- Iron frame	1,920									
- P.E. film	333									
- Heat insulation covers	306									
- Electric heatbed	149					149		149		
- Sprayer	227							227		
Sub-total	2,935					149		376		
0 Operating costs										
- Management costs	2,333	3,091	→	→	→	→	→	→	→	→
∘ Cucumber	1,346	1,725	→	→	→	→	→	→	→	→
∘ Oriental melon	987	1,366	→	→	→	→	→	→	→	→
- Small tools	10	→	→	→	→	→	→	→	→	→
- Repairs/Maintenance	132	→	→	→	→	→	→	→	→	→
Sub-total	2,475	3,233	→	→	→	→	→	→	→	→
0 Opportunity cost	300	→	→	→	→	→	→	→	→	→
Total	5,710	3,533	→	→	→	3,682	3,533	3,909	3,533	→
*Cash flow before financing	535	2,712	→	→	→	2,563	2,712	2,336	2,712	2,735
Financing										
0 Loan receipt	2,700									
0 Loan repayment										
- Principal		540	→	→	→	→				
- Interest	216	216	173	130	86	43				
*Cash flow after financing	2,683	1,956	1,999	2,042	2,086	1,980	2,712	2,336	2,712	2,735

*FRR before financing : over 50%

*ERR : 50%

12; Financial analysis of greenhouse Project

Crop : Pumpkin-Greenpepper
Area : 10a

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales										
- 1st crop : Pumpkin	1,602	→	→	→	→	→	→	→	→	→
- 2nd crop : Green pepper	2,428	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	4,030	→	→	→	→	→	→	→	→	4,053
Cost										
0 Investment/Replacemement costs										
- Iron frame	1,920									
- P.E. film	333									
- Heat insulation covers	306									
- Electric heatbed	149					149		149		
- Sprayer	227							227		
Sub-total	2,935					149		376		
0 Operating costs										
- Management costs	2,281	3,039	→	→	→	→	→	→	→	→
∘ Pumpkin	986	1,365	→	→	→	→	→	→	→	→
∘ Green Pepper	1,295	1,674	→	→	→	→	→	→	→	→
- Small tools	10	→	→	→	→	→	→	→	→	→
- Repairs/Maintenance	132	→	→	→	→	→	→	→	→	→
Sub-total	2,423	3,181	→	→	→	→	→	→	→	→
0 Opportunity cost	300	→	→	→	→	→	→	→	→	→
Total	5,658	3,481	→	→	→	3,630	3,481	3,857	3,481	→
*Cash flow before financing	(1,628)	549	→	→	→	400	549	173	549	572
Financing										
0 Loan receipt	2,500									
0 Loan repayment										
- Principal		500	→	→	→	→				
- Interest	200	200	160	120	80	40				
*Cash flow after financing	336	(151)	(111)	(71)	(31)	(140)	549	173	400	572

*FRR before financing : 37%

*IERR : 31%

13. Financial analysis of greenhouse Project

Crop : Lettuce-Cucumber
Area : 10a

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales										
-1st crop : Lettuce	1,265	→	→	→	→	→	→	→	→	→
-2nd crop : Cucumber	2,455	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	3,720	→	→	→	→	→	→	→	→	3,743
Cost										
0 Investment/Replacement costs										
-Iron frame	1,920									
-P.E. film	333									
-Heat insulation covers	306									
-Heating facility	149					149		149		
-Electric heatbed	227							227		
Sub-total	2,935					149		376		
0 Operating costs										
-Management costs	2,080	2,838	→	→	→	→	→	→	→	→
• Lettuce	734	1,113	→	→	→	→	→	→	→	→
• Cucumber	1,346	1,725	→	→	→	→	→	→	→	→
-Small tools	10	→	→	→	→	→	→	→	→	→
-Repairs/Maintenance	132	→	→	→	→	→	→	→	→	→
Sub-total	2,222	2,980	→	→	→	→	→	→	→	→
0 Opportunity cost	300	→	→	→	→	→	→	→	→	→
Total	5,457	3,280	→	→	→	3,429	3,280	3,656	3,280	→
*Cash flow before financing	(1,737)	440				291	440	64	440	463
Financing										
0 Loan receipt	2,400									
0 Loan repayment										
-Principal		480	→	→	→	→				
-Interest	192	192	154	115	77	38				
*Cash flow after financing	135	(232)	(194)	(155)	(117)	(78)	440	64	440	463

* FRR before financing : 18%
* ERR : 21%

14. Financial analysis of greenhouse Project

Crop : Cucumber-Cucumber
Area : 10a

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7-10	11	12-14	15
Benefit										
0 Sales										
- 1st crop : Cucumber	3,588	→	→	→	→	→	→	→	→	→
- 2nd crop : Cucumber	2,018	→	→	→	→	→	→	→	→	→
0 Residual value										23
Total	5,606	→	→	→	→	→	→	→	→	5,629
Cost										
0 Investment/Replacement costs										
- Iron frame	1,920									
- P.E. film	333									
- Heat insulation covers	306									
- Heating facility	336					336		336		
- Electric heatbed	149					149		149		
- Sprayer	227							227		
Sub-total	3,271					485		712		
0 Operating costs										
- Management costs	3,426	4,184	→	→	→	→	→	→	→	→
* Cucumber	2,080	2,459	→	→	→	→	→	→	→	→
* Cucumber	1,346	1,725	→	→	→	→	→	→	→	→
- Small tools	10	→	→	→	→	→	→	→	→	→
- Repairs/Maintenance	132	→	→	→	→	→	→	→	→	→
Sub-total	3,568	4,326	→	→	→	→	→	→	→	→
0 Opportunity cost	300	→	→	→	→	→	→	→	→	→
Total	7,139	4,626	→	→	→	5,111	4,626	5,338	4,626	→
*Cash flow before financing	(1,533	980	→	→	→	495	980	268	980	1,003
Financing										
0 Loan receipt	3,300									
0 Loan repayment										
- Principal		660	→	→	→	→				
- Interest	264	264	211	158	106	53				
*Cash flow after financing	1,503	56	109	162	214	(218)	980	268	980	1,003

* FRR before financing : over 50%
* ERR : 50%

15. Financial analysis of greenhouse Project

Crop : Chrysanthemum-Tomato
Area : 10a

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7~10	11	12~14	15
Benefit										
0 Sales										
-1st Crop : Chrysanthemum	7,989	→	→	→	→	→	→	→	→	→
-2nd Crop : Tomato	2,258	→	→	→	→	→	→	→	→	→
0 Residual value										416
Total	10,247	→	→	→	→	→	→	→	→	10,663
Cost										
0 Investment/Replacement costs										
-Iron frame	1,920									
-P.E. film	469									
-Heat insulation covers	306									
-Irrigation facility	3,150							3,150		
-Heating facility	241					48		241		
-Ventilating facility	149					149		149		
-Electric heatbed	540							540		
-Sprayer	227							227		
Sub-total	7,002					197		4,307		
0 Operating costs										
-Management costs	6,510	7,286	→	→	→	→	→	→	→	→
•Chrysanthemum	5,139	5,536	→	→	→	→	→	→	→	→
•Tomato	1,371	1,750	→	→	→	→	→	→	→	→
-Small tools	30		→	→	→	→	→	→	→	→
-Repairs/Maintenance	312		→	→	→	→	→	→	→	→
Sub-total	6,852	7,628	→	→	→	→	→	→	→	→
0 Opportunity cost	300	→	→	→	→	→	→	→	→	→
Total	14,154	7,928	→	→	→	8,125	7,928	12,235	7,928	→
* Cash flow before financing	(3,907)	2,319	→	→	→	2,122	2,319	(1,988)	2,319	2,735
Financing										
0 Loan receipt	7,600									
0 Loan repayment										
-Principal		1,520	→	→	→	→				
-Interest	608	608	486	365	243	122				
*Cash flow after financing	3,085	191	313	434	566	677	2,139	(1,988)	2,319	2,735

* FRR before financing : over 50%
* ERR : 50%

16. Financial analysis of greenhouse Project

Additional Facilities : Cucumber-Green Pepper
Area : 10a

In thou. Won

Item	Project year						
	1	2	3	4	5	6	7-10
Benefit							
Sales							
A. With Project	10,018	10,930	→	→	→	→	→
-Cucumber	2,305	2,515	→	→	→	→	→
-Green Pepper	7,713	8,415	→	→	→	→	→
B. Without Project	8,656	→	→	→	→	→	→
-Cucumber	1,984	→	→	→	→	→	→
-Green Pepper	6,672	→	→	→	→	→	→
(A-B) Net incremental benefit	1,362	2,274	→	→	→	→	→
Costs							
0 Investment/Replacement costs							
-Irrigation facility	1,134					284	
-Ventilating facility	540						
-Heating facility	450					450	
Sub-total	2,124					734	
0 Operating costs							
A. With Project	2,496	→	→	→	→	→	→
-Labor	1,340	→	→	→	→	→	→
-Fuel	1,156	→	→	→	→	→	→
B. Without Project	1,848	→	→	→	→	→	→
-Labor	1,763	→	→	→	→	→	→
-Fuel	85	→	→	→	→	→	→
(A-B) Incremental Operating costs	648	→	→	→	→	→	→
0 Repairs/Maintenance costs							
A. With Project	327	→	→	→	→	→	→
B. Without Project	221	→	→	→	→	→	→
(A-B) Incremental R/M costs	106	→	→	→	→	→	→
Total incremental costs	2,878	754	→	→	→	1,488	754
* Total incremental benefit before financing	(1,516)	1,520	→	→	→	786	1,520
Financing							
0 Loan receipt	1,400						
0 Loan repayment							
-Principal		280	→	→	→	→	
-Interest	112	112	90	67	45	23	
* Total incremental benefit after financing	(228)	1,128	1,150	1,173	1,195	483	1,520

* FRR before financing 26%

* ERR : 50%

Financial and economic analyses of orchard development

17. Financial analysis of apple orchard development

Variety : Dwarfstock:Fuji
Area : 1ha

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7	8	9	10
Benefit										
0 Sale of apple				1,530	4,590	11,030	16,550	21,450	24,520	27,580
0 Intercropping	800	690	570							
Total	800	690	570	1,530	4,590	11,030	16,550	21,450	24,520	27,580
Cost										
0 Investment/Replacement costs	5,143	106				186	37		472	
- Saplings & Planting	1,318	106								
- Reclamation	2,560									
- Power sprayer	524								472	
- Mixing tank	70						7			
- Fence	371					186				
- Well	300						30			
0 Management costs	1,788	3,669	1,627	5,355	2,017	7,018	4,221	4,974	5,452	5,779
- Fertilizer	179	338	63	488	113	588	362	500	533	555
- Agro-chemicals	53	53	96	139	236	332	471	536	611	696
- Box				70	200	470	710	930	1,060	1,180
- Wages	1,040	2,870	1,090	4,320	1,320	5,470	2,510	2,840	3,080	3,180
- Fuel	40	50	60	70	80	90	100	→	→	→
- Maintenance	26	→	→	→	→	→	→	→	→	→
- Small tools	110	42	→	→	→	→	→	→	→	→
- Intercropping	340	290	250							
Total	6,931	3,775	1,627	5,155	2,017	7,204	4,258	4,974	5,924	5,799
*Cash flow before financing	(6,131)	(3,085)	(1,057)	(3,625)	2,573	3,826	12,292	16,476	18,596	21,801
Financing										
0 Loan receipt	4,100									
0 Loan repayment										
- Principal						1,030	1,030	1,020	1,020	
- Interest	328	→	→	→	→	→	246	163	82	
*Cash flow after financing	(2,359)	(3,413)	(1,385)	(3,953)	2,245	2,468	11,016	15,293	17,494	21,801

* FRR before financing : 38%
* ERR : 39%

17. Financial analysis of apple orchard development

Variety : Dwarfstock:Fuji
Area : 1ha

In thou. Won

Item	Project year									
	11	12	13	14	15	16	17	18	19	20
Benefit										
0 Sale of apple	27,580	→	→	→	→	24,520	21,450	16,550	12,870	9,800
0 Intercropping										
Total	27,580	→	→	→	→	24,520	21,450	16,550	12,870	9,800
Cost										
0 Investment/Replacement costs	186		37			658			37	
- Saplings & Planting										
- Reclamation										
- Power sprayer						472				
- Mixing tank			7						7	
- Fence	186					186				
- Well			30						30	
0 Management costs	5,791	→	→	→	→	5,176	4,832	4,546	4,136	3,910
- Fertilizer	556	→	→	→	→	431	397	361	338	325
- Agro-chemicals	707	→	→	→	→	→	→	→	→	→
- Box	1,180	→	→	→	→	1,060	930	710	560	430
- Wages	3,180	→	→	→	→	2,810	2,630	2,600	2,390	2,280
- Fuel	100	→	→	→	→	→	→	→	→	→
- Maintenance	26	→	→	→	→	→	→	→	→	→
- Small tools	42	→	→	→	→	→	→	→	→	→
- Intercropping										
Total	5,977	5,791	5,828	5,791	5,791	5,834	4,832	4,546	4,200	3,900
*Cash flow before financing	21,603	21,789	21,752	21,789	21,789	18,686	16,618	12,004	8,670	5,890
Financing										
0 Loan receipt										
0 Loan repayment										
- Principal										
- Interest										
*Cash flow after financing	21,603	21,789	21,752	21,789	21,789	18,686	16,618	12,004	8,670	5,890

* FRR before financing : 38%

18. Financial analysis of pear orchard development

Variety : Singo
Area : 1ha

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7	8	9	10
Benefit										
0 Sale of Pear					1,140	2,130	3,790	5,210	6,630	8,060
0 Intercropping	800	690	570	460						
Total	800	690	570	460	1,140	2,130	3,790	5,210	6,630	8,060
Cost										
0 Investment/Replacement costs	2,875	50				186	37		472	
- Saplings & Planting	630	50								
- Reclamation	980									
- Power sprayer	524								472	
- Mixing tank	70						7			
- Fence	37					186				
- Well	300						30			
0 Management costs	1,666	1,310	1,556	1,826	2,156	2,565	3,371	3,963	4,718	5,328
- Fertilizer	119	121	126	186	194	213	237	255	327	354
- Agro-chemicals	21	21	32	42	54	64	96	150	193	246
- Box					60	120	200	270	350	420
- Wages	1,010	770	1,040	1,280	1,730	2,040	2,710	3,160	3,710	4,160
- Fuel	40	40	40	50	50	60	60	60	70	80
- Maintenance	26	→	→	→	→	→	→	→	→	→
- Small tools	110	42	→	→	→	→	→	→	→	→
- Intercropping	340	290	200							
Total	4,541	1,360	1,556	1,826	2,156	2,751	3,408	3,963	5,190	5,328
*Cash flow before financing	(3,741)	(670)	(986)	(1,366)	(1,016)	(621)	382	1,247	1,440	2,732
Financing										
0 Loan receipt	2,500									
0 Loan repayment										
- Principal							630	630	620	620
- Interest	200	→	→	→	→	→	→	150	99	50
*Cash flow after financing	(1,440)	(870)	(1,186)	(1,566)	(1,216)	(821)	(448)	467	721	2,062

* FRR before financing : 19%
* ERR : 20%

18. Financial analysis of pear orchard development

Variety : Singo
Area : Iiva

In thou. Won

Item	Project year									
	11	12	13	14	15	16	17	18	19	20
Benefit										
0 Sale of pear	9,480	10,900	12,320	13,270	14,220	15,160	16,110	17,060	17,060	17,060
0 Intercropping										
Total	9,480	10,900	12,320	13,270	14,220	15,160	16,110	17,060	17,060	17,060
Cost										
0 Investment/Replacement costs	186		37			658			37	
- Saplings & Planting										
- Reclamation										
- Power sprayer						472				
- Mixing tank			7						7	
- Fence	186					186				
- Well			30						30	
0 Management costs	6,021	6,629	7,207	7,555	7,911	8,144	8,451	8,708	8,708	8,708
- Fertilizer	373	308	423	467	483	496	513	550	550	550
- Agro-chemicals	300	343	396	430	→	→	→	→	→	→
- Box	500	570	640	690	770	790	870	890	890	890
- Wages	4,700	5,160	5,600	5,820	6,080	6,280	6,490	6,690	6,690	6,690
- Fuel	80	→	→	→	→	→	→	→	→	→
- Maintenance	26	→	→	→	→	→	→	→	→	→
- Small tools	42	→	→	→	→	→	→	→	→	→
- Intercropping										
Total	6,207	6,629	7,244	7,555	7,911	8,802	8,451	8,708	8,745	8,708
*Cash flow before financing	3,459	4,271	5,076	5,715	6,309	6,358	7,659	8,352	8,315	8,352
Financing										
0 Loan receipt										
0 Loan repayment										
- Principal										
- Interest										
*Cash flow after financing	3,549	4,271	5,076	5,715	6,309	6,358	7,659	8,352	8,315	8,352

* FRR before financing : 19%

19. Financial analysis of peach orchard development

Variety : Baikdo
Area : 1ha

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7	8	9	10
Benefit										
0 Sale of peach				1,550	4,150	5,700	7,780	8,820	9,860	10,900
0 Intercropping	800	690	570							
Total	800	690	570	1,550	4,150	5,700	7,780	8,820	9,860	10,900
Cost										
0 Investment/Replacement costs	2,775	46				186	37		472	
- Saplings & Planting	530	46								
- Reclamation	980									
- Power sprayer	524								472	
- Mixing tank	70						7			
- Fence	371					186				
- Well	300						30			
0 Management costs	1,735	1,362	1,747	1,986	2,854	3,283	4,026	4,424	4,855	5,063
- Fertilizer	119	124	139	198	216	225	238	306	327	345
- Agro-chemicals	20	30	50	100	150	200	240	290	340	390
- Box				70	190	260	360	410	460	500
- Wages	1,080	810	1,200	1,500	2,180	2,480	3,060	3,290	3,600	3,690
- Fuel	40	40	40	50	50	50	60	60	60	70
- Maintenance	26	→								
- Small tools	110	42	→							
- Intercropping	340	290	250							
Total	4,510	1,408	1,747	1,986	4,854	3,469	4,063	4,424	5,327	5,063
*Cash flow before financing	(3,710)	(718)	(1,177)	(463)	1,296	2,231	3,717	4,396	4,553	5,837
Financing										
0 Loan receipt	2,400									
0 Loan repayment										
- Principal						600	→		→	
- Interest	192	→	→	→	→	→	144	96	48	
*Cash flow after financing	(1,502)	(910)	(1,369)	(628)	1,104	1,439	2,973	3,700	3,885	5,837

* FRR before financing : 30%
* ERR : 30%

19. Financial analysis of peach orchard development

Variety : Baikdo
Area : 1ha

In thou. Won

Item	Project year									
	11	12	13	14	15	16	17	18	19	20
Benefit										
0 Sale of peach	10,900	10,900	10,900	10,380	9,340	8,820	8,300	7,780	6,740	5,710
0 Intercropping										
Total	10,900	10,900	10,900	10,380	9,340	8,820	8,300	7,780	6,740	5,710
Cost										
0 Investment/Replacement costs	186		37			658			37	
- Saplings & Planting										
- Reclamation										
- Power sprayer						472				
- Mixing tank			7						7	
- Fence	186					186				
- Well			30						30	
0 Management costs	5,065	5,065	5,065	4,985	4,795	4,705	4,605	4,525	4,355	4,355
- Fertilizer	347	→	→	→	→	→	→	→	→	→
- Agro-chemicals	390	→	→	→	→	→	→	→	→	→
- Box	500	500	500	480	430	410	380	360	310	310
- Wages	3,690	3,690	3,690	3,630	3,490	3,420	3,350	3,290	3,170	3,170
- Fuel	70	→	→	→	→	→	→	→	→	→
- Maintenance	26	→	→	→	→	→	→	→	→	→
- Small tools	42	→	→	→	→	→	→	→	→	→
- Intercropping										
Total	5,251	5,065	5,102	4,985	4,795	5,363	4,605	4,525	4,392	4,355
*Cash flow before financing	5,649	5,835	5,798	5,395	4,545	3,457	3,695	3,255	2,348	1,355
Financing										
0 Loan receipt										
0 Loan repayment										
- Principal										
- Interest										
*Cash flow after financing	5,649	5,835	5,798	5,395	4,545	3,457	3,695	3,255	2,348	1,355

* FRR before financing : 30%

20. Financial analysis of grape orchard development

Variety : Campbell Early
Area : 1ha

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7	8	9	10
Benefit										
0 Sale of grape				2,330	3,720	5,590	7,450	8,380	9,780	10,710
0 Intercropping	800	690	570							
Total	800	690	570	2,330	3,720	5,590	7,450	8,380	9,780	10,710
Cost										
0 Investment/Replacement costs	5,479	87				576	37		472	
- Saplings & Planting	1,000	87								
- Reclamation	980									
- Power sprayer	524								472	
- Mixing tank	70					186	7			
- Fence	371						30			
- Well	300									
- Iron supportors	2,234					404				
0 Management costs	1,581	2,043	2,584	2,982	3,452	4,130	4,855	5,085	5,415	5,618
- Fertilizer	105	195	256	304	324	402	417	417	417	420
- Agro-chemicals	50	50	90	130	190	280	340	→	→	→
- Box				180	290	440	590	660	770	850
- Wages	920	1,410	1,890	2,260	2,540	2,900	3,390	3,550	3,770	3,880
- Fuel	30	30	30	40	40	40	50	50	50	60
- Maintenance	26	→	→	→	→	→	→	→	→	→
- Small tools	110	42	→	→	→	→	→	→	→	→
- Intercropping	340	290	250							
Total	7,060	2,130	2,584	2,982	3,452	4,706	4,892	5,085	5,887	5,618
*Cash flow before financing	(6,260)	(1,440)	(2,014)	(652)	268	884	2,558	3,295	3,893	5,092
Financing										
0 Loan receipt	4,300									
0 Loan repayment										
- Principal					1,080	1,080	1,070	1,070		
- Interest	344	→	→	→	→	258	171	86		
*Cash flow after financing	(2,304)	(1,784)	(2,358)	(966)	(1,156)	(454)	1,317	2,139	3,893	5,092

* FRR before financing : 18%
* ERR : 18%

20. Financial analysis of grape orchard development

Variety : Campbell Early
Area : 1ha

In thou. Won

Item	Project year									
	11	12	13	14	15	16	17	18	19	20
Benefit										
0 Sale of grape	10,710	→	→	→	→	9,780	9,320	8,850	7,920	5,590
0 Intercropping										
Total	10,710	→	→	→	→	9,780	9,320	8,850	7.920	5,590
Cost										
0 Investment/Replacement costs	576		37			1,062			37	
- Saplings & Planting										
- Reclamation										
- Power sprayer						472				
- Mixing tank			7			186			7	
- Fence	186									
- Well			30							
- Iron supportors	404					404				
0 Management costs	5,620	→	→	→	→	5,470	5,400	5,330	5,220	5,030
- Fertilizer	422	→	→	→	→	→	→	→	→	→
- Agro-chemicals	340	→	→	→	→	→	→	→	→	→
- Box	850	→	→	→	→	770	740	700	630	440
- Wages	3,880	→	→	→	→	3,810	3,770	3,740	3,700	3,700
- Fuel	60	→	→	→	→	→	→	→	→	→
- Maintenance	26	→	→	→	→	→	→	→	→	→
- Small tools	42	→	→	→	→	→	→	→	→	→
- Intercropping										
Total	6,196	5,620	5,657	5,620	5,620	6,532	5,400	5,330	5,257	5,030
*Cash flow before financing	4,514	5,090	5,053	5,090	5,090	3,248	3,920	3,520	2.663	560
Financing										
0 Loan receipt										
0 Loan repayment										
- Principal										
- Interest										
*Cash flow after financing	4,514	5,090	5,053	5,090	5,090	3,248	3,920	3,520	2,663	560

* FRR before financing : 18%

21. Financial analysis of sweet persimmon orchard development

Variety : Buyou
Area : 1ha

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7	8	9	10
Benefit										
0 Sale of sweet persimmon						990	2,480	4,140	6,620	8,280
0 Intercropping	800	690	570	460	350					
Total	800	690	570	460	350	990	2,480	4,140	6,620	8,280
Cost										
0 Investment/Replacement costs	2,905	54				186	37		472	
- Saplings & Planting	660	54								
- Reclamation	980									
- Power sprayer	524								472	
- Mixing tank	70						7			
- Fence	371					186				
- Well	300						30			
0 Management costs	1,625	1,368	1,552	1,557	1,903	1,874	2,159	2,391	2,807	3,010
- Fertilizer	119	174	174	179	215	226	271	284	319	322
- Agro-chemicals	20	20	30	30	30	40	50	79	90	110
- Box						30	70	120	190	240
- Wages	990	790	1,010	1,050	1,410	1,480	1,660	1,800	2,100	2,230
- Fuel	20	20	20	30	30	30	40	40	40	40
- Maintenance	26	→	→	→	→	→	→	→	→	→
- Small tools	100	42	→	→	→	→	→	→	→	→
- Intercropping	340	290	250	200	150					
Total	4,530	1,422	1,552	1,557	1,903	2,060	2,196	2,391	3,279	3,01
*Cash flow before financing	(3,730)	(732)	(982)	(1,097)	(1,553)	(1,070)	284	1,749	3,341	5,270
Financing										
0 Loan receipt	2,500									
0 Loan repayment										
- Principal							630	630	620	620
- Interest	200	→	→	→	→	→	→	150	99	50
*Cash flow after financing	(1,430)	(932)	(1,182)	(1,297)	(1,753)	(1,270)	(546)	969	2,622	4,600

* FRR before financing : 26%

* ERR : 26%

21. Financial analysis of sweet persimmon orchard development

Variety : Buyou
Area : 1ha

In thou. Won

Item	Project year									
	11	12	13	14	15	16	17	18	19	20
Benefit										
0 Sale of sweet persimmon	9,930	11,590	13,240	14,900	17,380	20,700	→	→	→	→
0 Intercropping										
Total	9,930	11,590	13,240	14,900	17,380	20,700	→	→	→	→
Cost										
0 Investment/Replacement costs	186		37			658			37	
- Saplings & Planting										
- Reclamation										
- Power sprayer						472				
- Mixing tank			7							
- Fence	186					186				
- Well			30						30	
0 Management costs	3,295	3,465	3,665	3,796	3,926	4,139	→	→	→	→
- Fertilizer	337	337	367	378	378	391	→	→	→	→
- Agro-chemicals	130	140	160	160	160	180	→	→	→	→
- Box	280	340	380	430	500	590	→	→	→	→
- Wages	2,430	2,530	2,640	2,710	2,1770	2,860	→	→	→	→
- Fuel	50	→	→	→	→	→	→	→	→	→
- Maintenance	26	→	→	→	→	→	→	→	→	→
- Small tools	42	→	→	→	→	→	→	→	→	→
- Intercropping										
Total	3,481	3,465	3,702	3,796	3,926	4,797	4,139	→	→	→
*Cash flow before financing	6,449	8,125	9,538	11,104	13,454	15,903	16,561	16,561	16,524	16,561
Financing										
0 Loan receipt										
0 Loan repayment										
- Principal										
- Interest										
*Cash flow after financing	6,449	8,125	9,538	11,104	13,454	15,903	16,561	16,561	16,524	16,561

* FRR before financing : 26%

22. Financial analysis of maesil orchard development

Variety : Baikgaha
Area : 1ha

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7	8	9	10
Benefit										
0 Sale of maesil				1,110	1,850	5,540	7,640	11,080	11,080	11,080
0 Intercropping	800	690	570							
Total	800	690	570	1,110	1,850	5,540	7,640	11,080	11,080	11,080
Cost										
0 Investment/Replacement costs	2,775	41				186	37		472	
- Saplings & Planting	530	41								
- Reclamation	980									
- Power sprayer	524								472	
- Mixing tank	70						7			
- Fence	371					186				
- Well	300						30			
0 Management costs	1,296	1,307	1,362	1,512	1,876	2,166	2,473	2,783	3,041	3,096
- Fertilizer	110	110	154	154	198	198	275	275	363	418
- Agro-chemicals	20	40	60	150	300	→	→	→	→	→
- Box				80	130	400	550	790	790	790
- Wages	670	779	810	1,030	1,060	1,170	1,240	1,310	1,480	1,480
- Fuel	20	20	20	30	30	30	30	40	→	→
- Maintenance	26	→	→	→	→	→	→	→	→	→
- Small tools	110	42	→	→	→	→	→	→	→	→
- Intercropping	340	290	250	→	→	→	→	→	→	→
Total	4,071	1,348	1,362	1,512	1,786	2,352	2,510	2,783	3,513	3,096
*Cash flow before financing	(3,271	(658)	(792)	(402)	64	3,188	5,130	8,297	7,567	7,984
Financing										
0 Loan receipt	2,200									
0 Loan repayment										
- Principal						550	→	→	→	
- Interest	176	→	→	→	→	→	132	88	44	
*Cash flow after financing	(1,247	(834)	(968)	(578)	(112	2,462	4,448	7,659	6,973	7,984

* FRR before financing : 38%

* ERR : 38%

22. Financial analysis of maesil orchard development

Variety : Baikgaha
Area : 1ha

In thou. Won

Item	Project year									
	11	12	13	14	15	16	17	18	19	20
Benefit										
0 Sale of maesil	11,080	→	→	→	→	→	→	→	→	→
0 Intercropping										
Total	11,080	→	→	→	→	→	→	→	→	→
Cost										
0 Investment/Replacement costs	186		37			658			37	
- Saplings & Planting										
- Reclamation										
- Power sprayer						4/2				
- Mixing tank			7						7	
- Fence	186					186				
- Well			30						30	
0 Management costs	3,166	3,166	3,166	3,166	3,166	3,166	3,166	3,166	3,166	3,166
- Fertilizer	418	→	→	→	→	→	→	→	→	→
- Agro-chemicals	300	→	→	→	→	→	→	→	→	→
- Box	790	→	→	→	→	→	→	→	→	→
- Wages	1,550	→	→	→	→	→	→	→	→	→
- Fuel	40	→	→	→	→	→	→	→	→	→
- Maintenance	26	→	→	→	→	→	→	→	→	→
- Small tools	42	→	→	→	→	→	→	→	→	→
- Intercropping										
Total	3,352	3,166	3,203	3,166	3,166	3,824	3,166	3,166	3,203	3,166
*Cash flow before financing	7,728	7,914	7,877	7,914	7,914	7,256	7,914	7,914	7,877	7,914
Financing										
0 Loan receipt										
0 Loan repayment										
- Principal										
- Interest										
*Cash flow after financing	7,728	7,914	7,877	7,914	7,914	7,256	7,914	7,914	7,877	7,914

* FRR before financing : 38%

23. Financial analysis of jujube orchard development

Variety : Mudeung
Area : 1ha

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7	8	9	10
Benefit										
0 Sale of Jujube				890	1,490	3,490	4,830	8,010	10,880	13,550
0 Intercropping	800	690	570							
Total	800	690	570	890	1,490	3,490	4,830	8,010	10,880	13,550
Cost										
0 Investment/Replacement costs	3,785	140				186	37		472	
- Saplings & Planting	1,540	140								
- Reclamation	980									
- Power sprayer	524								472	
- Mixing tank	70						7			
- Fence	371					186				
- Well	300						30			
0 Management costs	1,206	1,150	1,184	1,077	1,389	1,573	1,763	2,145	2,375	2,660
- Fertilizer	110	132	176	209	231	275	275	297	297	352
- Agro-chemicals	20	40	60	120	240	240	300	300	360	360
- Box				30	50	120	170	290	390	480
- Wages	580	600	610	620	770	840	910	1,150	1,220	1,360
- Fuel	20	20	20	30	30	30	40	→	→	→
- Maintenance	26	→	→	→	→	→	→	→	→	→
- Small tools	110	42	→	→	→	→	→	→	→	→
- Intercropping	340	290	250							
Total	4,991	1,290	1,184	1,077	1,389	1,759	1,800	2,145	2,847	2,660
*Cash flow before financing	(4,191)	(600)	(614)	(187)	101	1,731	3,030	5,865	8,033	10,890
Financing										
0 Loan receipt	2,900									
0 Loan repayment										
- Principal						730	730	720	720	
- Interest	232	→	→	→	→	→	174	115	58	
*Cash flow after financing	(1,523)	(832)	(846)	(419)	(131)	769	2,126	5,030	7,255	10,890

* FRR before financing : 37%

* ERR ; 36%

23. Financial analysis of jujube orchard development

Variety : Mudeung
Area : 1ha

In thou. Won

Item	Project year									
	11	12	13	14	15	16	17	18	19	20
Benefit										
0 Sale of mudeung	16,950	→	→	→	→	→	→	→	→	→
0 Intercropping										
Total	16,950	→	→	→	→	→	→	→	→	→
Cost	186		37			658			37	
0 Investment/Replacement costs										
- Saplings & Planting										
- Reclamation										
- Power sprayer						472				
- Mixing tank			7						7	
- Fence	186					186				
- Well			30							
0 Management costs	2,790	2,790	2,790	2,790	2,790	2,790	2,790	2,790	2,790	2,790
- Fertilizer	352	352	352	352	352	352	352	352	352	352
- Agro-chemicals	360	360	360	360	360	360	360	360	360	360
- Box	610	→	→	→	→	→	→	→	→	→
- Wages	1,360	→	→	→	→	→	→	→	→	→
- Fuel	40	→	→	→	→	→	→	→	→	→
- Maintenance	26	→	→	→	→	→	→	→	→	→
- Small tools	42	→	→	→	→	→	→	→	→	→
- Intercropping										
Total	2,976	2,790	2,827	2,790	2,790	3,448	2,790	2,790	2,827	2,790
*Cash flow before financing	13,974	14,160	14,123	14,160	14,160	13,502	14,160	14,160	14,123	14,160
Financing										
0 Loan receipt										
0 Loan repayment										
- Principal										
- Interest										
*Cash flow after financing	13,974	14,160	14,123	14,160	14,160	13,502	14,160	14,160	14,123	14,160

* FRR before financing : 37%

Fruit production and sales amount by the Project years

Amount : thou.Won
Area : 10a

Fruits		Project years								
		4	6	8	10	12	14	16	18	20
Apple	Yield (kg)	250	1,800	3,500	4,500	4,500	4,500	4,000	2,700	1,600
	Amount	153	1,103	2,145	2,758	2,758	2,758	2,452	1,655	980
Pear	Yield (kg)		450	1,100	1,700	2,300	2,800	3,200	3,600	3,600
	Amount		213	521	806	1,090	1,327	1,516	1,706	1,706
Peach	Yield (kg)	300	1,100	1,700	2,100	2,100	2,000	1,700	1,500	1,100
	Amount	155	570	882	1,090	1,090	1,038	882	778	571
Grape	Yield (kg)	500	1,200	1,800	2,300	2,300	2,300	2,100	1,900	1,200
	Amount	223	559	838	1,071	1,071	1,071	978	885	559
Sweet Persimmon	Yield (kg)		120	500	1,000	1,400	1,800	2,500	2,500	2,500
	Amount		99	414	828	1,159	1,490	2,070	2,070	2,070
Maesil	Yield (kg)	216	1,080	2,160	2,160	2,160	2,160	2,160	2,160	2,160
	Amount	111	554	1,108	1,108	1,108	1,108	1,108	1,108	1,108
Jujube	Yield (kg)	87	340	780	1,320	1,650	1,650	1,650	1,650	1,650
	Amount	89	349	801	1,355	1,695	1,695	1,695	1,695	1,695

Financial and economic analyses of on-farm storage project

24. Financial analysis of on-farm storage Project

Variety : Apple
Area : 20pyong (66㎡)

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7	8	9	10
Storable quantitiy										
-Yield, M/T	24.3	31.5	36.0	40.5	→	→	→	→	→	36.0
-Storable 80% of yield, M/T	19.4	25.2	28.2	30.0	→	→	→	→	→	28.8
Benefit										
0 Sale after stored period	13,660	17,591	20.279	21,123	→	→	→	→	→	20,279
0 Sale immediately after harvest	11.392	15,448	17,654	18,390	→	→	→	→	→	17,654
Incremental benefit	1,768	2,143	2,625	2,733	→	→	→	→	→	2,625
Cost										
0 Investment/Replacement costs										
-Storage construction cost	6,400						640			
-Stored boxes	1,708	1,014	624	208		668				
0 Management costs										
-Wages	420	546	624	650	→	→	→	→	→	624
-Sterilization	50	→	→	→	→	→	→	→	→	→
-Maintenance	43	53	59	62	→	→	→	→	→	→
0 Opportunity cost	30	→	→	→	→	→	→	→	→	→
Total	8,651	1,693	1,387	1,000	792	1,460	1,432	792	792	766
*Cash flow before financing	(6,883)	450	1,238	1,733	1,941	1,273	1,301	1,941	1,941	1,859
Financing										
0 Loan receipt	5,200									
0 Loan repayment										
-Principal		870	870	870	870	860	860			
-Interest	416	416	346	277	207	138	69			
*Cash flow after financing	(2,099)	(836)	22	586	864	275	372	1,941	1,941	1,859

* FRR before financing :18%
* ERR : 17%

24. Financial analysis of on-farm storage Project

Variety : Apple
Area : 20pyong (66m^2)

₩. thou. Won

Item	Project									
	11	12	13	14	15	16	17	18	19	20
Storable quantity										
-Yield, M/T	31.5	24.3	18.9	14.4	16.2	24.3	31.5	36	40.5	40.5
-Storable 80% of yield, M/T	25.2	19.4	15.1	11.5	13	19.4	25.2	28.8	30	30
Benefit										
0 Sale after stored period	17,591	13,660	10,635	8,101	9,152	13,660	17,591	20.279	21,132	21,123
0 Sale immediately after harvest	15,448	11,892	9,256	7,050	7,969	11,892	15,448	17,654	18,390	18,390
Incremental benefit	2,413	1,768	1,379	1,051	1,183	1,768	2,143	2,625	2,733	2,733
Cost										
0 Investment/Replacement costs			640						640	
-Storage construction cost										
-Stored boxes	668					658				
0 Management costs										
-Wages	546	420	327	249	282	420	546	624	650	650
-Sterilization	50	→	→	→	→	→	→	→	→	→
-Maintenance	62	→	→	→	→	→	→	→	→	→
0 Opportunity cost	30	→	→	→	→	→	→	→	→	→
Total	1,356	562	1,109	391	424	1,230	688	766	1,432	792
*Cash flow before financing	787	1,206	270	660	759	538	1,455	1,859	1,301	1,941
Financing										
0 Loan receipt										
0 Loan repayment										
-Principal										
-Interest										
*Cash flow after financing	787	1,206	270	660	759	538	1,455	1,859	1,301	1,941

* FRR before financing 18%

Financial and economic analyses of farm machinery

25. Financial analysis of large speed Sprayer

Apple Orchard : 5ha

In thou. Won

Item	Project year						
	1	2	3	4	5	6	7
Spraying of agro-chemicals							
A. Without Project							
-Labor : M.manday	159	179	193	207	215	219	223
F.manday	111	126	135	144	150	153	156
-Agro-chemical Vol.in thou.liters	76	108	128	148	174	182	190
B. With Project							
-Labor : One driver manday	15	15	15	15	15	15	15
One assitant	15	15	15	15	15	15	15
-Agro-chemical Vol.in thou.liters	65	92	109	126	148	155	162
Benefit:cost saved							
A. Operating costs without project							
-Labor cost	3,066	3,461	3,724	3,987	4,145	4,224	4,303
-Agro-chemicals	1,634	2,322	2,752	3,182	3,741	3,913	4,085
-Fuel	102	137	158	180	208	216	225
-Maintenance and repairs	53	53	53	53	53	53	53
Total	4,855	5,973	6,687	7,402	8,148	8,406	8,666
B. Operating costs with Project							
-Labor cost	360	360	360	360	360	360	360
-Agro-chemical vol.,in thou.liters	1,398	1,978	2,344	2,709	3,182	3,333	3,483
-Fuel	150	192	218	244	278	289	299
-Maintenance and repairs	1,200	1,200	1,200	1,200	1,200	1,200	1,200
Total	3,108	3,730	4,122	4,513	5,020	5,182	5,342
Cost saved : A - B	1,747	2,243	2,565	2,889	3,128	3,224	3,324
Investment							
A. Without Project							
-Price of 2 power sprayers	1,048						(105)
B. With Project							
-Price of one speed sprayer	12,000						(1,200)
Additional investment Cost : B-A	10,952						(1,095)
*Cash flow before financing	(9,205)	2,243	2,565	2,889	3,128	3,224	4,419
Financing							
0 Loan receipt	8,400						
0 Loan repayment							
-Principal	1,200	1,200	1,200	1,200	1,200	1,200	1,200
-Interest	672	576	480	384	288	192	96
*Cash flow after financing	(2,677)	467	885	1,305	1,640	1,832	3,123

* FRR before financing 22%

*. ERR : 14%

26. Financial analysis of Power mower

Apple Orchard : 3ha

In thou. Won

Item	Project year						
	1	2	3	4	5	6	7
Working plan							
0 Work : Mowing out unnecessary weeds							
0 Work capacity : 4 times per year	12ha	12ha	12ha	12ha	12ha	12ha	12ha
Costs							
A. Without Project							
-Labor cost	840	840	840	840	840	840	840
B. With Project	1,888	463	463	463	463	463	321
-Price of power mower	1,425						(142)
-Labor cost for driver	153	153	153	153	153	153	153
-Fuel	167	167	167	167	167	167	167
-Maintenance and repairs	143	143	143	143	143	143	143
Additional costs : B - A	(1,048)	(377)	(377)	(377)	(377)	(377)	(519)
* Cash flow before financing	(1,048)	377	377	377	377	377	519
Financing							
0 Loan receipt	990						
0 Loan repayment							
-Principal	330	330	330				
-Interest	80	53	27				
*Cash flow after financing	(468)	(6)	20	377	377	377	519

* FRR before financing : 29%

* ERR : 17%

Financial and economic analyses of upland irrigation

27. Financial analysis of movable sprinkler irrigation on vegetable field

Area : 1ha

In thou. Won

Item					Project year							
					1	2	3	4	5	6	7	8-10
Benefit												
A. Without Project												
Vegetables		Area	Yield	Prices								
1st crop	2nd crop	(a)	kg/10a	Won/kg								
Red Pepper		50	154	2,963	2,282	→	→	→	→	→	→	2,282
	Carrot	50	2,036	199	2,028	→	→	→	→	→	→	2,028
potato		50	1,695	186	1,576	→	→	→	→	→	→	1,576
	Chinese Onion	50	2,823	171	2,415	→	→	→	→	→	→	2,415
Total					8,031	→	→	→	→	→	→	8,031
B. With Project												
Vegetables		Area	Yield	Prices								
1st crop	2nd crop	(a)	kg/10a	Won/kg								
Red Pepper		50	185	3,111	2,877	→	→	→	→	→	→	2,877
	Carrot	50	2,443	209	2,553	→	→	→	→	→	→	2,553
Potato		50	20,34	195	1,983	→	→	→	→	→	→	1,983
	Chinese Onion	50	3,388	179	3,042	→	→	→	→	→	→	3,042
Total					10,455	→	→	→	→	→	→	10,455
Incremental benefit : B - A					2,154	→	→	→	→	→	→	2,154
Production costs												
A. Without Project					5,886	→	→	→	→	→	→	5,886
B. With Project					6,474	→	→	→	→	→	→	6,474
Additional costs : B - A					588	→	→	→	→	→	→	588
Investment and Management costs												
0 Investment & replacement costs					2,772					136		
0 Management costs												
- Labor cost					200	→	→	→	→	→	→	200
- Fuel					186	→	→	→	→	→	→	186
- Maintenance and repairs					98	→	→	→	→	→	→	98
Total cost					3,256	484	484	484	484	620	484	484
* Cash flow before financing					(1,690)	1,082	1,082	1,082	1,082	946	1,082	1,082
Financing												
0 Loan receipt					1900							
0 Loan repayment												
- Principal								480	480	470	470	
- Interst					152	152	152	152	114	75	38	
* Cash flow after financing					58	930	930	450	488	401	574	1,082

* FRR before financing over50%

* ERR : 50%

28. Financial analysis of fixed sprinkler irrigation on apple orchard

Area : 1ha

In thou. Won

Item	Project year							
	1	2	3	4	5	6	7	8
Production (M/T)								
-Without Project	18	27	35	40	45	45	45	45
-With Project	18	28	36	42	47	47	47	47
Benefit								
A. Without Project	11,030	16,550	21,450	24,520	27,580	27,580	27,580	27,580
B. With Project	12,132	18,872	24,264	28,308	31,678	31,678	31,678	31,678
Incremental benefit (B-A)	1,102	2,292	2,814	3,788	4,098	4,098	4,098	4,098
Cost								
0 Investment and replacement costs								
-Well	598							
-Pumping station	1,005					280		
-Piping	1,240							
-Sprinkler equipments	637					212		
-Taxes	763							
Sub-total	4,243					492		
0 Management costs								
-Labor	167	→	→	→	→	→	→	→
-Fuel	198	→	→	→	→	→	→	→
-Maintenance and repairs	157	→	→	→	→	→	→	→
Sub-total	522	→	→	→	→	→	→	→
Total cost	4,765	522	522	522	522	1,014	522	522
*Cash flow before financing	(3,663)	1,770	2,292	3,266	3,576	3,084	3,576	3,576
Financing								
0 Loan receipt	2,900							
0 Loan repayment								
-Principal						580	580	580
-Interest	232	232	232	232	232	232	186	139
*Cash flow after financing	(995)	1,538	2,060	3,034	3,344	2,272	2,810	2,857

* FRR before financing over 50%

* ERR : 50%

28. Financial analysis of fixed sprinkler irrigation on apple orchard

Area : 1ha

In thou. Won

Item	Project year						
	9	10	11	12	13	14	15
Production (M/T)							
-Without Project	45	45	40	35	27	21	16
-With Project	47	47	42	37	28	22	17
Benefit							
A. Without Project	27,580	27,580	24,520	21,450	16,550	12,870	9,800
B. With Project	31,678	31,678	28,308	24,938	18,872	14,828	11,458
Incremental benefit (B-A)	4,098	4,098	3,788	3,488	2,322	1,958	1,658
Cost							
0 Investment and replacement costs							
-Well							
-Pumping station			280				
-Piping			210				
-Sprinkler equipments			637				
-Taxes							
Sub-total			1,127				
0 Management costs							
-Labor	167	→	→	→	→	→	→
-Fuel	198	→	→	→	→	→	→
-Maintenance and repairs	157	→	→	→	→	→	→
Sub-total	552	→	→	→	→	→	→
Total cost	522	522	1,649	522	522	522	522
*Cash flow before financing	3,576	3,576	2,319	2,966	1,800	1,436	1,136
Financing							
0 Loan receipt							
0 Loan repayment							
-Principal	580	580					
-Interest	93	46					
*Cash flow after financing	2,903	2,950	2,139	2,966	1,800	1,436	1,136

* FRR before financing : over 50%

Financial and economic analyses of special crops

29. Financial analysis of ginseng Production Project

Area : 10a

In thou. Won

Item	Project year			
	1	2	3	4
Benefit				
0 Sales				
-Fresh root				5,760
-Seed				240
0 Residual value				100
Total				6,100
Costs				
0 Investment/Replacement costs				
-Nursery root		371		
-Shade frame		540	109	129
-Sprayer	227			
Sub-total	227	911	109	129
0 Operating costs				
-Management costs	275	735	588	379
-Small tools	20	→	→	→
-Repairs/Maintenance	11	38	18	18
Sub-total	306	793	626	419
0 Opportunity costs	150	→	→	→
Total	683	1,854	885	698
*Cash flow before financing	(683)	(1,854)	(885)	5,402
Financing				
0 Loan receipt		870		
0 Loan repayment				
-Principal				870
-Interest		70	70	70
*Cash flow after financing	(683)	(1,054)	(815)	4,462

* FRR before financing 26%

* ERR : 26%

30. Financial analysis of oyster mushroom Project

Produced in fermented straw

House:50pyong,Growing bed:70pyong

In thou. Won

Item	Project year						
	1	2	3	4	5	6	7
Benefit							
0 Sale of mushroom	4,312	→	→	→	→	→	→
0 Sale of straw manure	80	→	→	→	→	→	→
0 Residual value							872
Total	4,392	→	→	→	→	→	5,264
Cost							
0 Investment cost	4,113						
0 Management cost							
-Spawn and other materials	908	→	→	→	→	→	→
-Fuel	719	→	→	→	→	→	→
-Packing box	218	→	→	→	→	→	→
-Labor cost	1,320	→	→	→	→	→	→
-Maintenance&repair	206	→	→	→	→	→	→
Sub-total	3,371	→	→	→	→	→	→
0 Opportunity cost	30	→	→	→	→	→	→
Total	7,514	3,401	→	→	→	→	→
*Cash flow before financing	(3,202)	991	→	→	→	→	1,863
Financing							
0 Loan receipt	4,400						
0 Loan repayment							
-Principal		880	→	→	→	→	
-Interest	352	352	282	211	141	70	
*Cash flow after financing	864	(241)	(171)	(100)	(30)	41	1,863

FRR befor financing 24%

ERR : 22%

31. Financial analysis of oak mushroom Project

Quantity : 5.000log

In thou. Won

Item	Project year					
	1	2	3	4	5	6
Benefit						
0 Sale of mushroom		1,200	4,320	3,680	1,920	960
0 Sale of used logs						250
0 Residual value						117
Total		1,120	4,320	3,680	1,920	1,327
Cost						
0 Investment costs	4,635					
0 management costs						
-Labour cost for management		509	529	501	424	332
-maintenance and repair		50	→	→	→	→
Sub-Total	4,635	559	579	551	474	432
0 Rent for forest shade	50	→	→	→	→	→
Total	4,685	609	629	601	524	482
*Cash flow before financing	(4,685)	511	3,691	3,079	1,396	845
Financing						
0 Loan receipt	3,200					
0 Loan repayment						
-principal			1,080	1,060	1,060	
-Interest	256	256	256	170	85	
*Cash flow after financing	(1,229)	255	2,355	1,849	251	845

FRR before financing : 30%

ERR : 28%

32. Financial analysis of deodug root Project

Planting area : 10a
Rootplanting in spring

In thou. Won

Item	Project year		
	1	2	3
Benefit			
0 Deodug root prduction		1,100	1,650
0 Seed production		60	60
Total		1,160	1,710
Costs			
0 Investment cost			
-cost of nersery root	520		
-Supporting pole	350		
-Labour cost ,etc.	422		
Sub-Total	1,292		
0 Management costs		386	246
-Maintenance and repair		70	70
Sub Total		456	316
0 Opportunity cost	85	→	→
Total	1,377	541	401
*Cash flow before financing	(1,377)	619	1,309
Financing			
0 Loan receipt	900		
0 Loan repayment			
-Principal		450	450
-Interest	72	72	36
*Cash flow after financing	(549)	97	823

* FRR before financing 23%
* ERR : 20%

33. Financial analysis of oneeja fruit Project

Area : 1ha

In thou. Won

Item	Project year						
	1	2	3	4	5	6	7
Benefit							
0 Sale of fruit		3,200	6,400	7,200	7,200	3,200	3,200
0 Residual value							2,175
Total		3,200	6,400	7,200	7,200	3,200	5,375
Costs							
0 Investment cost							
-Nursery trees	1,350						
-Planting labor costs	240						
-Concrete supporting poles	2,875						
-others	3,184						
Sub-Total	7,649						
0 Mangement costs from 2nd year							
-Fertilizer&agro-chemicals		484	→	→	→	→	→
-Labor		1,650	→	→	→	→	→
-others		50	→	→	→	→	→
Sub-Total		2,184	→	→	→	→	→
0 Opportunity cost	600	→	→	→	→	→	→
Total	8,249	2,784	→	→	→	→	→
*Cash flow before financing	(8,249)	416	3,616	4,416	4,416	416	2,591
Financing							
0 Loan receipt	4,600						
0 Loan repayment							
-Principal			1,540	1,530	1,530		
-Interest	388	368	368	245	122		
*Cash flow after financing	(4,017)	48	1,708	2,641	2,764	416	2,591

* FRR before financing 21%

* ERR : 22%

34. Financial analysis of Kookija fruit Project

Area : 1ha

In thou. Won

Item	Project year						
	1	2	3	4	5	6	7
Benefit							
0 Sale of kookija fruit		5,000	7,500	→	→	→	→
0 Residual value							5,208
Total		5,000	7,500	→	→	→	12,708
Costs							
0 Investment cost							
-Nursery tree	6,000						
-Planting labor costs	510						
-others	2,017						
Sub-Total	8,527						
0 Management costs from 2nd year							
- Fertilizer agro-chemicals		970	→	→	→	→	→
-Labor		1,700	→	→	→	→	→
-others		50	→	→	→	→	→
Sub-Total		2,720	→	→	→	→	→
0 Opportunity cost	600	→	→	→	→	→	→
Total	9,127	3,320	→	→	→	→	→
*Cash flow before financing	(9,127)	1,680	4,180	→	→	→	9,388
Financing							
0 Loan receipt	4,800						
0 Loan repayment							
-Principal			1,600	1,600	1,600		
-Interest	384	384	384	256	128		
*Cash flow after financing	(4,..1)	1,296	2,196	2,324	2,452	4,180	9,388

FRR before financing : 41%

ERR : 34%

Financial and economic analyses of beekeeping

35. Financial analysis of beekeeping Project

Quantity : 10Swarms

In thou. Won

Item	Project year									
	1	2	3	4	5	6	7	8	9	10
Benefit										
0 Honey Production	270	351	486	576	→	→	→	→	→	→
0 Sale of beehives			480	720	→	→	→	→	→	→
0 Residual value										1,600
Total	270	351	966	1,296	→	→	→	→	→	2,896
Costs										
0 Investment/Replacement cost	1,195	68	108	122	122	236	135	→	→	→
0 Managment cost	270	345	470	520	→	→	→	→	→	→
Total	1,465	413	578	642	642	756	655	→	→	→
*Cash flow before financing	(1,195	(62)	388	654	654	540	641	→	→	2,241
Financing										
0 Loan receipt	1,000									
0 Loan repayment										
-Principal			340	330	330					
-Interest	80	80	80	53	26					
*Cash flow after financing	(275)	(142)	(32)	271	298	540	641	→	→	2,241

* FRR before financing; 34%

* ERR : 34%

AUG 27 1989 2013

TO: WORLD BANK
AUG. 26, 1989

MR. GRAHAM DONALDSON
DIVISION CHIEF, AGRICULTURE, INFRASTRUCTURE AND HUMAN RESOURCES
DIVISION OPERATIONS EVALUATION DEPARTMENT, THE WORLD BANK

DEAR MR. DONALDSON:
RE: FOURTH AGRICULTURAL CREDIT PROJECT (LOAN 2549-KO) PROJECT
COMPLETION REPORT

THANK YOU FOR YOUR INFORMATION ABOUT ABOVE MENTIONED REPORT.
REVIEWING THE DRAFT REPORT SENT TO US, I WOULD LIKE TO COMMENT ON
IT AS FOLLOWS:

AA) AS YOU MAY KNOW WELL, GOVERNMENT ORIGINALLY PROVIDED NACF WITH 21.9 BILLION WON FOR THE PURPOSE OF PROTECTING NACF AGAINST THE FOREIGN EXCHANGE RISK OF THE LOAN AND ALSO THIS FUND HAS CONTRIBUTED TO THE ENLARGEMENT OF THE PROJECT VOLUME EVENTUALLY. THE FOREIGN EXCHANGE RISK HAS BEEN FULLY CLEARED BY THE INTEREST GAP ACCRUED FROM THE GOVERNMENT FUND WHICH HAD BEEN FINANCED TO FARMERS. (REF. NACF PCRVB PAGE 49-50)
ACCORDINGLY, LINE 11-13 ON PAGE VI IN YOUR EVALUATION SUMMARY WOULD BE REVISED IN DUE EXPRESSION.

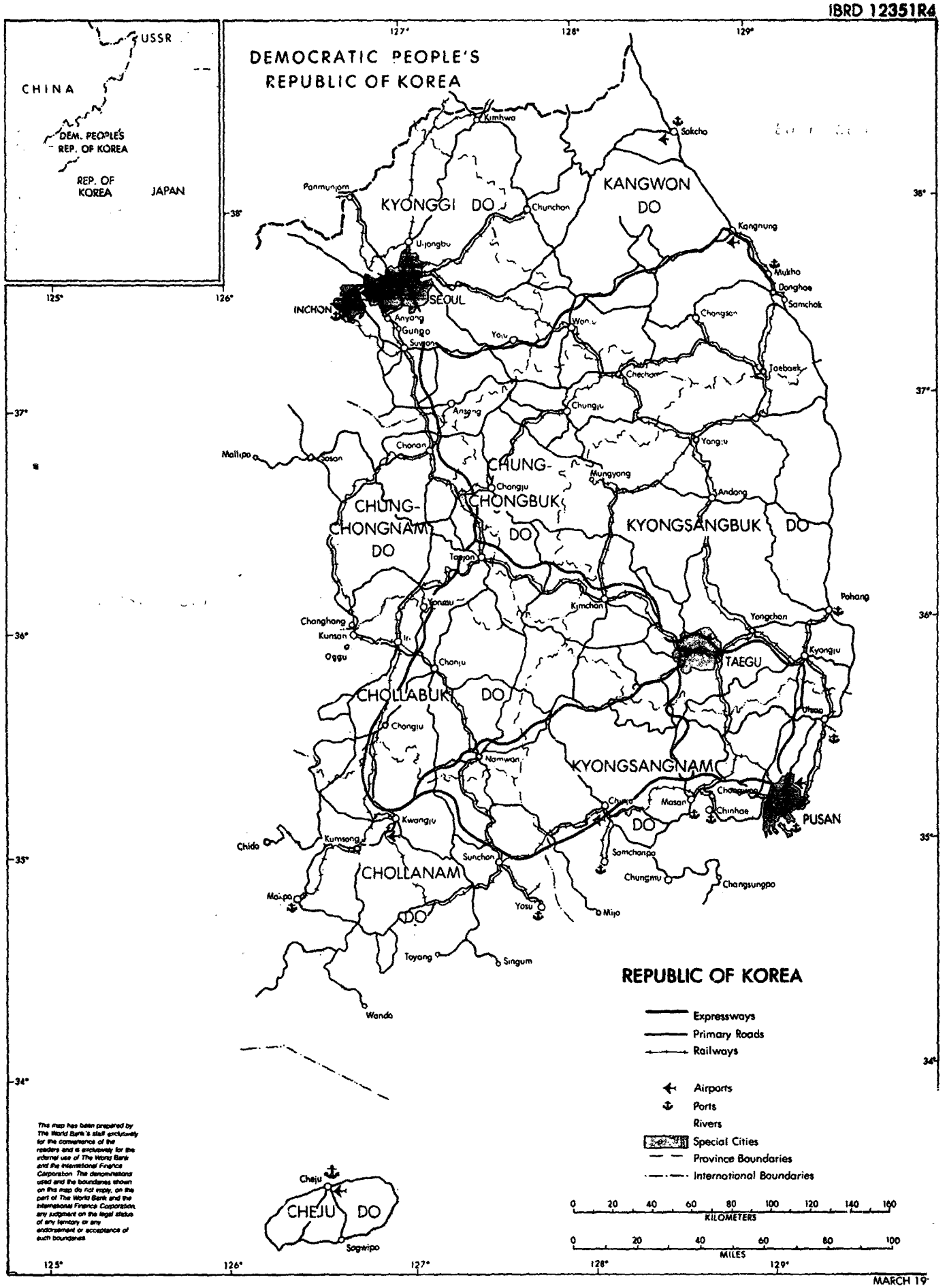
See: Evaluation Summary

BB) THE FCREIGN EXCHANGE RISK IS NOT THE ONLY BLOCK TO A FOLLOW-ON LOAN.
IN ADDITION TO THE FE RISK FOR THE LOAN, THERE COULD BE SUCH REASONS NOT TO PROCEED A FOLLOW-ON LOAN AS A SLIGHT GAP BETWEEN 8PCT INTEREST RATE OF SUBLOANS AND SOME 7.7PCT INTEREST RATE OF THE LOAN, THE NECESSITY OF INFLATION CONTROL AND THE POSSIBILITIES OF MOBILIZATION OF DOMESTIC CAPITAL UNDER THE RECENT BLANCE OF INTERNATIONAL PAYMENTS IN BLACK ETC.
IN THIS CONNECTION, FINDINGS AND LESSIONS B)ON PAGE VII IN YOUR EVALUATION SUMMARY WOULD BE INCLUDED OTHER REASONS IN ADDITION TO THE FE RIS.
YOUR DEEP UNDERSTANDING WILL BE HIGHLY APPRECIATED.

SINCERELY YOURS
EUN KEE SONG
DIRECTOR AND GENERAL MANAGER
INTERNATIONAL BANKING DEPARTMENT
NATIONAL AGRIUCLTURAL COOPERATIVE FEDERATION

NATIONAL AGRICULTURAL COOPERATIVE FEDERATION
INTERNATIONAL BANKING DEPT., H. O.

NACOF K32329, K32330



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MARCH 19